BRITISH MEDICAL JOURNAL

LONDON SATURDAY OCTOBER 12 1940

A REVIEW OF THE CAUSES OF DIABETES MELLITUS*

BY

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LECTURE I

The complete removal of the pancreas of a dog by von Mering and Minkowski in 1889 showed that the pancreas was essential for the life of that animal, and it is now accepted that man also cannot live without it. Allen (1920) demonstrated that if one-sixth to one-tenth of the pancreas was left behind after operation the dog developed a mild diabetes. The fraction of the pancreas which is necessary to prevent diabetes occurring in man is unknown. The case of a woman was related (Graham, 1926) in which the body of the pancreas, together with a large portion of the head and most of the tail, was removed at operation. The head and body showed advanced fibrosis, but the tail was healthy. The fat-splitting and fat-absorption were normal, but the sugar-tolerance curve was abnormal three weeks after the operation. The patient reduced the carbohydrate of the diet, but when seen always passed sugar. The sugar-tolerance test gradually became more abnormal, but there were no symptoms of diabetes until sixteen years after operation. The slow decrease in sugar tolerance in this patient is similar to that described by Allen (1920) as occurring in his partially depancreatized dog, which was made to pass sugar by overfeeding with sugar, starch, or protein. The β cells lost their granules, developed vacuoles, and eventually broke up. This condition can be reversed by giving a low-calorie diet (Allen, 1920).

Changes in the β Cells

The observations on the partially depancreatized patient suggest that a gradual degeneration of the β cells occurred similar to that of Allen's dogs. Patients with mild diabetes who continue to pass sugar often have no symptoms for a long time, but eventually suffer from loss of weight and energy, and show other signs of the disease. This type of patient, like the partially depancreatized dog and patient, responds very well to insulin. If the carbohydrate of the diet is adequate and the blood sugar is completely controlled with insulin the patient may be able to give up insulin after a while.

The work on the pancreas suggests that the β cells are damaged, but we have no evidence as to the cause of the destruction, even in the acute cases where patients pass into coma within seven days of the onset of symptoms. The pathological changes in the pancreas have been studied by Opie (1910), Weichselbaum and Stangl (1902), Lane (1907), and Bensley (1911–12), and our knowledge is well summarized by Shields Warren (1938). The earlier workers described certain definite changes in the β cells, and their frequency is best demonstrated in Warren's table of his own cases.

He examined 534 cases, some of which showed more than one lesion. In 127 (or 23.7%) there were no pathological changes in the pancreas, and there was nothing to suggest that the patient had had diabetes; in 129 (24.3%) there was fibrosis of the β cells, but in only 12 (2.2%) were the changes well marked. Hyalinization of the island was present in 200 (37.4%) cases, and was well marked in 93 (17.3%). Hydropic degeneration was present in 22 (4.1%) cases, hypertrophy in 38 (7.1%), and minor changes in 18 (3.3%). The cases in which considerable damage was done were: 12 with fibrosis, 77 with hyalinization, and 24 with hydropic degeneration —a total of 113 (21%). These figures are very disturbing, especially when it is remembered that in 127 (23.7%) cases the pancreas appeared quite normal.

Warren points out that hyaline degeneration occurs chiefly in the elderly diabetics, often with a mild form of the disease, and that 50% of the patients known to have had diabetes for ten years showed this lesion. As fibrosis also tends to occur in the older people, both it and hyalinization may be characteristic of long-standing disease in the elderly. But both fibrosis and hyalinization occur in patients who have never had diabetes. Out of 200 cases 7.5% showed fibrosis and 2% hyalinization. The changes were as a rule slight, as only 1% showed marked fibrosis and hyalinization. Allen thought that hydropic degeneration was the characteristic lesion, as he found it in the partially depancreatized dogs who had been overfed with sugar and starch, and after long-continued protein overfeeding. Warren found it in only 5.5% of the diabetic patients, and it was present in 1% of the normal. It is, however, regarded as a change due to gross overwork or a wearing out of the cell, and it was expected that it would be a common lesion. It can be argued, however, that the β cells die off one by one, and that there are never many affected at any one time.

The Pituitary Gland and Sensitivity to Insulin

This deadlock was brought to an end by the work of Houssay and his collaborators in Buenos Aires. He and Magenta (1924) showed that if the anterior pituitary gland or hypophysis was entirely removed the animal became much more sensitive to insulin. Six years later Houssay and Biasotti (1930a, 1930b) found that they could produce diabetes in a toad by removing the pancreas, but that if the pituitary was first removed diabetes did not develop. It could, however, be produced at once if a graft of the pituitary was inserted. They repeated this work on a dog, allowing an interval for recovery (sixteen to sixty-one days) between the preliminary removal of the anterior lobe of the pituitary and the pancreatectomy. The diabetic condition produced was very mild, and only one dog out of eight needed any insulin, and then only for a period of nineteen days. These interesting observations suggested

* The Croonian Lectures delivered before the Royal College of Physicians of London on May 16 and 21, 1940.

that there was a very close relation between the anterior lobe of the pituitary and the islands of Langerhans, and that in the absence of the pituitary the amount of insulin necessary for the normal working of the body was much less than usual.

In 1932 three sets of workers—Evans and others (1932), Bauman and Marine (1932), and Houssay and others (1932)—all showed that when extracts of the anterior lobe were injected into dogs or rabbits the animals developed hyperglycaemia and glycosuria. The condition was, however, a transitory one, and ceased either quickly (Houssay and Marine) or slowly (Evans). Young (1937, 1938a, 1938b) confirmed these observations, and showed that if the dose of the extract was doubled the glycosuria returned, but again tended to disappear. If the dose was again doubled the glycosuria returned, and after one or more courses of treatment developed a diabetic condition which was permanent, although the injections were stopped. The diabetic condition differed in some important particulars from that which occurs after a pancreatectomy. The animals seemed well, tended to gain weight, and had more glycogen in their liver than depancreatized dogs. Although the glycosuria could be controlled with insulin the animals kept well without it for long periods if they were given enough food to eat. They responded to the hypoglycaemic action of insulin, but nothing like so well as a depancreatized dog. When the dogs either died or were killed the pituitary, adrenal, and thyroid glands were all normal, but the pancreas showed definite changes in the islands. These, however, were not constant, since either many of the islands might be completely replaced by hyaline material or the β cells of the islands might only be reduced in number, leaving the α cells unaffected (Richardson and Young, 1938; Richardson, 1940). Although hydropic degeneration occurs they suggested that it was seen only when the pancreas was subjected to a great rush of work. The pancreas of one dog appeared normal except for a decrease in the number of cytoplasmic granules in the β cells. The changes in the pancreas are almost as varied as those which are seen in the human pancreas. Yet it seems certain that the β cells are damaged by the pituitary extracts and that the diabetes arises as a result of the destruction caused by them, since the amount of insulin produced by the pancreas is much decreased. Thus Campbell and Best (1938) removed the pancreas from a dog which had been rendered diabetic with pituitary extracts. The insulin required to keep the animal well on a diet containing 85.6 grammes of glucose was 1.69 units per kg., or 16 units, while 11.2 grammes of glucose was excreted. After the animal was depancreatized the same amount of insulin was necessary, but the sugar excretion was rather higher at 18 grammes. This suggested that the amount of insulin secreted was very small, and on assay the pancreas yielded only 2.5 units instead of 80. This has been confirmed by Marks and Young (1939b).

So far it has been found impossible to make a rat diabetic with pituitary extracts, and the amount of insulin secreted has increased by 130% to 250% (Marks and Young, 1939a). Young failed to make one dog diabetic, and in this case the islands of Langerhans were bigger and much more numerous than usual.

Marks and Young (1940) have shown that an insulin-increasing or pancreatotrophic substance is present in the hypophysis, but that it is not identical with either the diabetogenic or the growth substance. An extract which increases the islets in the rat may cause diabetes in the dog, or it may be innocuous if the diabetogenic substance is not present. The discovery of a pancreatotrophic substance raises the hope that it may be active in human beings and so stimulate the growth of the β cells. If this hope is realized it may be possible to cure patients who make only a small amount of insulin.

The destruction of the β cells in any individual case may be due either to a susceptibility of these cells in patients who have a family or racial history of the disease or to a great excess of the diabetogenic substance. Further, the lesions in the dog's pancreas resemble those found in 50% of Warren's patients who had had diabetes for more than ten years. This type of patient is as a rule very easily controlled by insulin and is not liable to suffer from sudden attacks of hypoglycaemia. The insulin dosage of my partially depancreatized woman has been very constant in the last two years and lends support to the view that in this type of diabetes the patient has an extensive lesion of the pancreas and is making too little insulin.

Substances inhibiting Insulin Action

The intensive study of the various substances extracted from the hypophysis has shown that another substance has an effect on insulin: Young (1938a, 1938b) has demonstrated that a substance separated from prolactin, which is concerned with the crop function of birds and milk production of mammals, inhibits the action of insulin. It seems possible that this glycotrophic substance has an important role. It is apparently similar to that prepared by Collip (1938), which also inhibited insulin. Pituitrin, which is extracted from the posterior lobe, also has the power of inhibiting the action of insulin. This was first shown by Burn (1923) working with rabbits, and by Lawrence and Hewlett (1925) on human beings, with and without diabetes. Pituitrin is of great value in preventing hypoglycaemia and also in raising the blood sugar after hypoglycaemia. The property of antagonizing insulin is shared by the two substances present in pituitrin, but the anti-insulin effect of vasopressin is about twice as great as that of oxytocin (Gurd, 1934). There are thus at least two substances—the glycotrophic factor and pituitrin—which inhibit the action of insulin and may well be responsible for the insulin-resistant cases, and there should therefore be at least two types of diabetes.

It is well recognized that it is quite impossible to say, by estimating the blood sugar, how much insulin a patient will require to lower the blood sugar to normal. The dose may be a small one—10 to 20 units—or it may be 100 to 200 units or more before the diabetic condition is controlled. The largest amount recorded is 3,240 units a day, and in spite of this heroic dose no less than 82 grammes of sugar was excreted. Some months later the dose had decreased to a mere 400 units (Wiener, 1938). Many of these insulin-resistant cases are fairly stable and do not suffer from severe attacks of hypoglycaemia, except when they begin to improve. Others, however, are very unstable and may suffer severely from attacks of hypoglycaemia.

Types of Diabetic Patient

Himsworth (1936) and Himsworth and Kerr (1939), as a result of work on sugar-tolerance and insulin-depression curves, concluded that diabetic patients could be divided into two main types—the insulin-sensitive and the insulin-insensitive or resistant. Himsworth examined 36 cases by a most time-consuming method: 14 were sensitive and 22 insensitive. He thought that the two types were quite distinct. De Wesselow and Griffiths (1938) repeated this work, and while they agreed that there were two types of disease they did not think that the types were pure, but that some cases were of a mixed type. Their experiments were criticized by Himsworth and Kerr (1939) on the ground that they did not estimate the blood sugar at such frequent intervals as the latter workers, who think the difference between the conclusions can thus be explained.

I find it difficult to believe that the two types are so clear-cut for the following reasons: (1) It does not agree with my clinical experience, for I have seen patients with an acute attack of diabetes whose condition often improved so much that the insulin was either given up or was continued in a much reduced dosage. After a variable period of time the condition is difficult to control, and some of these patients become definitely insulin-resistant. (2) Although the conditions of the test were very carefully chosen I think an important control was omitted. The patient was given nothing to eat after 6.30 p.m., and the test began at 10 a.m., some two to three hours after the usual time of breakfast. One of the difficulties of controlling diabetics is the tendency for the blood sugar to begin to rise before the morning injection, and in some cases this takes place one to two hours before the injection. In Himsworth's cases the effect of the evening insulin may have worn off by 10 a.m. and the blood sugar may have been about to rise in his insulin-insensitive cases. If this were the case it would explain why the blood sugar rose so rapidly after sugar and could not be controlled by the insulin. If a control without sugar or insulin had been carried out two days before the first test the experiment would then have been above suspicion.

The clinical evidence for the insulin-resistant type is strengthened by the work on the glycotrophic substance. It would be natural to expect that this substance would be present in the blood. Boller, Uiberrak, and Falta (1934) and de Wesselow and Griffiths (1936) reported experiments which suggested that the blood of insulin-insensitive patients contained a substance which inhibited the action of insulin, but Himsworth and Kerr (1939) were unable to confirm this. It is possible that this is due to the small amount which is present in the blood at any one time; more might be excreted in the urine and might be more easily isolated, but so far this has not been reported.

The evidence, therefore, is in favour of two main causes of diabetes: in one the β cells are damaged and produce very little insulin; and in the other the β cells are normal, but, owing to the presence of an interfering substance, fail to produce enough insulin, although they may produce a great deal.

Insulin Dosage

These two causes will explain the great majority of the cases of diabetes, but certain difficulties remain to be explained. The first of these is the respective size of the morning and evening doses of insulin. I would have expected that the morning dose of insulin would be greater than the evening dose, because it has to look after the carbohydrate of three meals—some 150 grammes of carbohydrate—and the evening insulin only one meal—C. 50 grammes, if 200 grammes of carbohydrate is eaten; but this is not the case. I have analysed the figures for 243 patients who have been attending regularly in my follow-up department and whose blood sugar is under reasonable control. In 86 (35.4%) the dose was exactly the same. In 112 (46.2%) the morning dose was 5 units greater than the evening dose. In 23 (9.47%) the difference was between 5 and 10 units, while in 7 (2.48%) it was over 10 units. Further, the evening dose was greater by 1 to 5 units in 11 (4.53%) cases, in 3 by between 5 and 10 units, and in 1 by over 10 units. The figures for the protamine-zinc-insulin are also instructive. In 24 cases protamine-zinc-insulin by itself controlled the diabetic condition, but in 13 the dose of soluble insulin was equal to and in 32 was greater than that of protamine-zinc-insulin, and in 11 the dose of protamine-zinc-insulin was greater than that of soluble insulin. The finding that the morning dose is not always greater than the evening dose can be explained by saying that the body's need of insulin is considerable during the night in some cases. It is easy to understand this being so if, for instance, the patient has an active tuberculosis with fever; but that is not the case with my patients.

It is equally difficult to explain the condition in which the blood sugar swings quickly from a hyperglycaemia of, say, 300 mg. to a hypoglycaemia of 40 to 50 mg. some four to six hours later, and back to a hyperglycaemia of 250 to 300 mg. in another six hours. This may take place with quite small doses of insulin—10 to 20 units—or with big doses of 100 units or more. This type of patient needs either three or four doses of insulin to control the diabetic condition, so protamine insulin was specially introduced by Hagedorn to avoid the inconvenience of the multiple injections. I have used this insulin in combination with soluble insulin on 48 patients who attend at hospital regularly and whose blood sugar at midday is fairly well controlled. In 19 cases a mixture of the two kinds of insulin is needed twice a day, because the blood sugar tends to rise rapidly both at 8 a.m. and at 7 p.m. In 12 a mixture of the two insulins was required in the morning, but the soluble insulin was sufficient in the evening, as the blood sugar did not rise before 8 a.m. In 1 a mixture was necessary in the morning, but in the evening protamine insulin was given alone, since the patient was liable to have hypoglycaemia before midnight if any soluble insulin was given. In 5 cases it was unnecessary to give any protamine insulin in the morning, but at night either a mixture or protamine alone was used. In 11 cases the soluble insulin, with its quick action, could not be given in the morning because of the risk of hypoglycaemia at midday. In 6 of these cases the soluble insulin was sufficient at night, but in 5 protamine insulin was necessary. Finally, the length of time which the different kinds of insulin take to cause hypoglycaemia varies greatly. In the majority of cases hypoglycaemia occurs three to four hours after the injection of soluble insulin, but in a few it may not take place until nine or ten hours after the morning or evening injection. The effects of protamine insulin also vary very much. In some cases its action is as quick as that of soluble insulin, while in others it is very slow. One patient has a dose of protamine insulin in the morning, and is liable to have hypoglycaemia some eighteen to twenty-four hours afterwards.

Variations in Response to Insulin

Again, one of the difficulties of looking after a bad diabetic is the varying response to insulin. This became especially noticeable when protamine insulin and protamine-zinc-insulin were used to control the difficult cases. Thus, on one day a patient may pass no sugar at all, the next day he may pass a good deal of sugar, and the following day he may have an attack of hypoglycaemia, though the dose of insulin is not changed. At first I ascribed this to the irregularity of the absorption of the insulin, but I have since observed it when soluble insulin is used, and think that it is due to some change in the patient's condition.

I find it very hard to attribute these fluctuations and variations of response to the damage of the β cells which has reduced the yield of insulin. It is impossible to explain them by the action of the glycotrophic substance if the same amount of this is present each day. If, however, the supply of the glycotrophic substance varies from day to day and from hour to hour it would explain why the response of the patient differed so much. It would

also explain the curious variation in the amount of protamine insulin and soluble insulin to which I have referred, the rapid swing from hyperglycaemia to hypoglycaemia and back again to hyperglycaemia, and the difference in the size of the two doses of insulin. This hypothesis of the varying activity on the part of the hypophysis is a pleasing one, as it will explain so many difficulties; but there is at present no direct evidence for it. If the amount of the glycotrophic substance and of insulin in the blood and urine can be estimated it should be possible to prove or disprove this hypothesis. The only direct evidence for the varying activity of the hypophysis is that provided by Dr. Leonard Mark (1912) in his observations on his own case. He described what he called an acromegalic state. This might come on at any time of the day, but was most common during the latter part of the morning. Its duration was very variable: it might last only about half an hour or it might be present all day. When he was in the acromegalic state his general appearance altered; his hands and feet were bigger, cold, and moist; his eyes were more sunken, and his tears flowed abundantly—so much so that the silk lapel of his frock-coat rotted. I have not found any other reference to this condition, as Harvey Cushing (1932) and Atkinson (1932) do not mention it. If, however, Leonard Mark's observations are correct the acromegalic state can only be due to a variation in the activity of the hypophysis, and if this takes place in acromegaly it may also occur in the secretion of the glycotrophic factor, and so explain many of our present difficulties.

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Y. M. Vesval (*Thèse de Paris*, 1940, No. 182), who has collected 57 cases of agranulocytosis in children aged from 3 months to 14 years, including a personal case in a boy aged 3½ years, states that twenty-eight were boys and twenty-nine girls. The prognosis is very grave. As in the adult the aetiology is very obscure; the occurrence of the disease may sometimes be explained by a toxic or more frequently an infective factor perhaps associated with a special predisposition of the bone marrow. Agranulocytosis in the child very frequently masks an acute leukaemia, and an early and correct diagnosis can only be obtained by a study of the myelogram.

CHANGES OCCURRING IN BLOOD STORED IN DIFFERENT PRESERVATIVES

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The object of the present investigation was to study the changes that occur in certain elements of the blood stored in different preservatives.

Methods of Investigation

The following characteristics were initially chosen for analysis: (i) total red cell count and red cell fragility in hypertonic saline; (ii) total white cell count and differential count; (iii) platelet count; (iv) sedimentation rate; (v) coagulation time. The red cells were counted in a Bürker counting chamber, using a 0.5% solution of gentian violet in normal saline as diluting fluid (Price-Jones, Vaughan, and Goddard, 1935), and the fragility was determined by the method of Dacie and Vaughan (1938). The platelets were counted by Lempert's modification of Kristenson's technique (Lempert, 1935); the sedimentation rate was done by Wintrobe's method (Wintrobe and Landsberg, 1935); and the coagulation time by a modification of Lee and White's (1913) technique, using a dry instead of a wet tube.

After a few observations it was found that the most striking effect of changing the preservative was upon the red cells. In subsequent experiments, therefore, the red cells only were studied. The blood was withdrawn by gravity (Vaughan, 1939). All examinations were made on small samples taken from the full bottle of blood at the time of examination. In many instances daily estimations were made, though for clarity only the weekly results are recorded in the tables. The solutions were:

1. Saline citrate solution (1.05% sodium citrate in 0.85% sodium citrate).

2. The same saline citrate with the addition of 0.3% glucose (giving a final concentration of 0.1%).

3 and 4. Both the above solutions fully oxygenated.

5. The saline citrate solution with 3% glucose (giving a final concentration of 1%).

6. The saline citrate solution with 6% glucose (giving a final concentration of 2%).

7. Caramelized 0.3% glucose saline citrate.

In all cases 2 parts of blood were added to 1 part diluent.

These solutions were chosen because, with the exception of No. 7, their use had been advocated by other workers.

If glucose is autoclaved with sodium citrate caramelization occurs. Although glucose can be added after the sodium citrate solution has been autoclaved, it is a rather cumbersome procedure. It therefore seemed worth while to determine whether the caramelized solution had the same preservative effect. Caramelization decreases the amount of reducing substance present.

Results

Sedimentation Rate.—As other observers have pointed out (Filatov, 1937; Macdonald and Stephen, 1939; Fahraeus, 1939), the sedimentation rate is retarded in stored blood. This appeared to be slightly less definite in solutions containing glucose, but the figures available allow of no definite conclusions on this point.

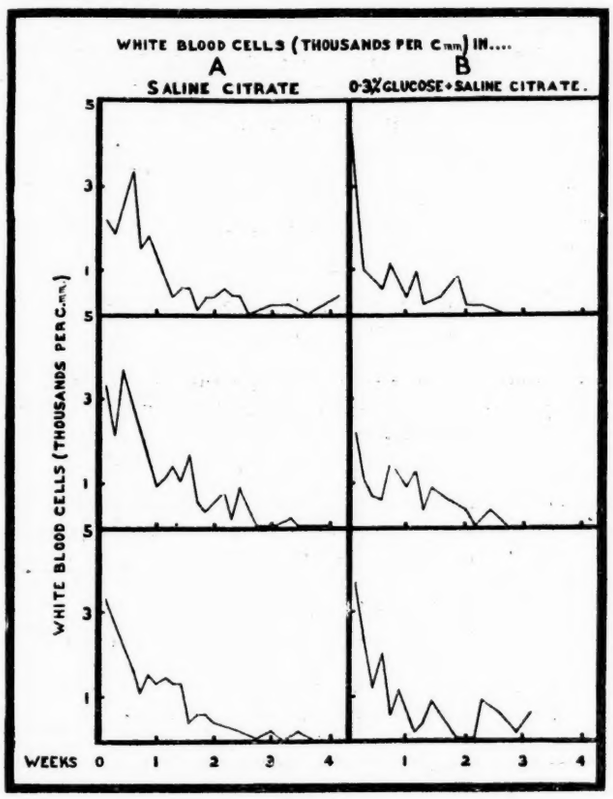
WHITE BLOOD CELLS (THOUSANDS PER C.mm.) IN....
A
SALINE CITRATE
B
0·3% GLUCOSE + SALINE CITRATE.
WHITE BLOOD CELLS (THOUSANDS PER C.mm.)
WEEKS 0 1 2 3 4 1 2 3 4

FIG. 1

TABLE I.—*Changes in Total White Cells at Three-day Intervals*

Preservative	No. of Samples	White Blood Cells—Thousands per c.mm.						
		1st Day	3rd Day	6th Day	9th Day	12th Day	15th Day	18th Day
Saline citrate	5	3.0	2.8	2.8	1.5	0.6	0.3	—
Final concentration 0.1% glucose–saline citrate	6	2.6	1.7	1.7	1.1	0.7	0.2	0.2

Coagulation Time.—The observations available on coagulation time suggest that it is definitely reduced by storage, the figures observed being in the neighbourhood of 3 to 6 minutes instead of the normal figure of 10 to 15 minutes: this reduction occurs within a few hours and remains approximately unaltered for a month. The results with M.R.C. saline citrate and 0.3% glucose–saline citrate were similar.

White Cell Count.—Daily white cell counts (Table I and Fig. 1) showed a rapid fall in white cells. In both the saline citrate and 0.1% glucose-saline citrate (final concentration) differential counts showed that the polymorphs were completely absent after ten days in all samples, disappearing in the majority of cases by the seventh day. Occasional eosinophils, basophils, and lymphocytes persisted for at least a month. These findings are in close agreement with those of most other workers (Filatov, 1937; Macdonald and Stephen, 1939).

Platelets.—The platelet count (Table II) fell on storage, but after the end of the second week a fairly constant count of 40,000 per c.mm. was still present both in the saline citrate and in the glucose-saline citrate. This result is not in agreement with those of previous observers (Filatov, 1937), who state that no platelets are found at the end of fifteen days.

Red Cell Fragility in Hypotonic Saline Solution.—Red cell fragility may conveniently be expressed as mean corpuscular fragility—i.e., that concentration of saline in which 50% of the cells are haemolysed (Table III).

TABLE II.—*Platelet Count at Weekly Intervals*

Preservative	No. of Samples	Platelets in 100,000 per c.mm.				
		1st Day	7 Days	14 Days	21 Days	28 Days
Saline citrate	5	1.3	0.6	0.4	0.4	0.3
Final concentration 0.1% glucose-saline citrate	6	1.0	1.0	0.6	0.4	—

TABLE III.—*Changes in M.C.F. of Red Cells at Weekly Intervals*

Preservative	No. of Samples	M.C.F.				
		1st Day	7 Days	14 Days	21 Days	28 Days
Saline citrate	6	0.36	0.44	0.54	0.72	0.90
Saline citrate oxygenated ..	3	0.37	0.43	0.51	0.70	0.82
Final concentration 0.1% glucose-saline citrate	6	0.38	0.42	0.48	0.54	0.61
Caramelized 0.1% saline citrate	2	0.38	0.43	0.45	0.55	0.65
Final concentration 0.1% glucose-saline citrate oxygenated	4	0.37	0.41	0.48	0.52	0.69
Final concentration 1% glucose-saline citrate	2	0.44	0.57	0.50	0.53	0.72
Final concentration 2% glucose-saline citrate	2	0.52	0.57	0.62	0.70	—

M.C.F. (Mean corpuscular fragility): % NaCl at which 50% of cells are haemolysed.

There is a steady increase in mean corpuscular fragility in all solutions hitherto investigated, but it is most marked in those which do not contain glucose (Fig. 2). The results obtained with 0.3% glucose (final concentration 0.1%) and 3% glucose (final concentration 1%) appear the same (Fig. 3). Caramelization of a 0.3% solution does not reduce its preserving qualities as measured by mean corpuscular fragility. An initial concentration of 6% glucose (final concentration 2%) causes increased haemolysis. Oxygenation of the red cells throughout the period of storage does not appreciably affect their fragility.

Red Cell Count.—In solutions that do not contain glucose the red cell count (Table IV, Fig. 4) falls below 3,000,000 per c.mm. at approximately the end of the second week; in solutions containing glucose up to 3% (final concentration 1%) the count is maintained at the 3,000,000 level in some instances for longer than a month. How-

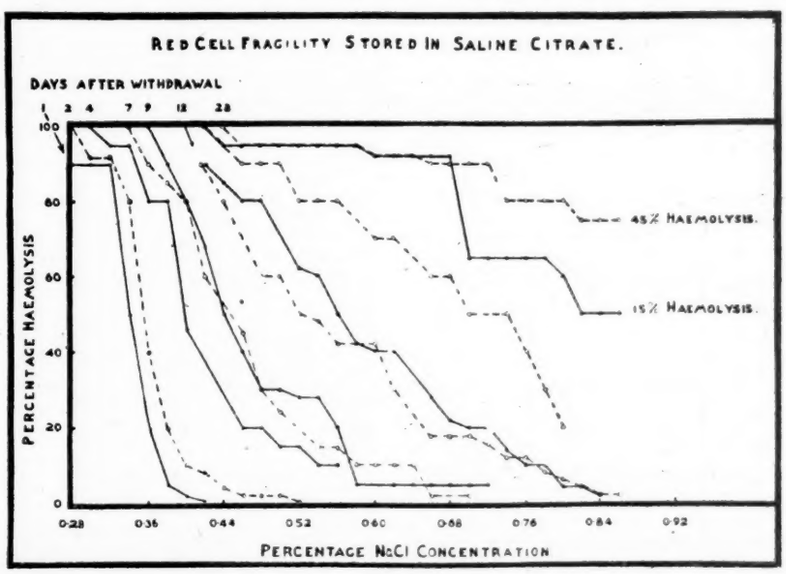

FIG. 2

TABLE IV.—*Changes in Total Red Cells at Weekly Intervals*

Preservative	No. of Samples	Red Blood Cells (millions per c.mm.)				
		1 Day	7 Days	14 Days	21 Days	28 Days
Saline citrate	6	3.3	3.2	2.9	2.3	1.5
Saline citrate oxygenated ..	3	3.5	3.4	3.3	3.0	2.7
Final concentration 0.1% glucose–saline citrate	6	3.4	3.2	3.1	3.1	3.0
Caramelized 0.1% saline citrate	2	3.7	3.5	3.5	3.2	3.2
Final concentration 0.1% glucose–saline citrate oxygenated	4	3.4	3.4	3.3	3.2	2.9
Final concentration 1% glucose–saline citrate	2	3.5	3.4	3.1	3.1	2.7
Final concentration 2% glucose–saline citrate	2	3.5	3.3	3.3	3.2	2.6

ever, a possible source of error in such observation was pointed out to us by Dr. Maizels. Since normal saline is used as a diluent for counting red cells, and some degree of haemolysis may occur at this concentration of saline, it is probable that cells are haemolysed in process of diluting, thus making the observed counts too low. A few observations made on using plasma as diluting fluid have shown that this is true. The divergence between the red cell count made in plasma citrate diluent from that made with gentian violet saline diluent becomes more marked with increasing fragility of the red cells. Fresh plasma of the same group not mixed with citrate saline has the same preserving effect (Table V). All previous data on red cell counts must therefore be regarded with suspicion, and in future red cell counts on stored blood should be made, using the plasma anti-coagulant mixture as diluent.

TABLE V.—*Effect of Diluent on Red Cell Counts*

Age of Blood in Days	Red Cells (millions per c.mm.)		
	Diluting Fluid	Citrated Plasma	Fresh Plasma
22	2.1	2.6	2.6
24	1.6	3.2	3.2
25	3.3	3.6	3.6
25	3.3	3.8	3.6
40	2.0	3.0	2.7
43	2.4	3.7	3.4

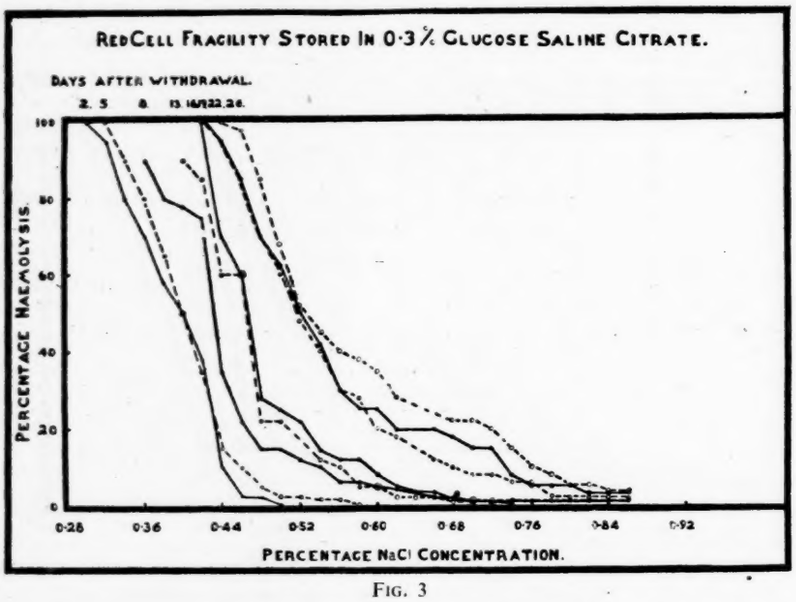

FIG. 3

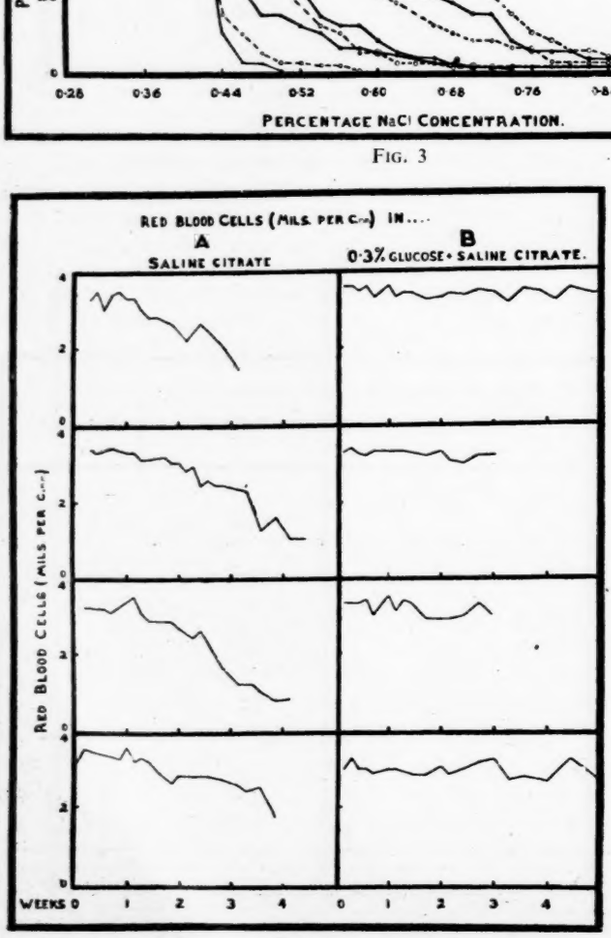
RED BLOOD CELLS (MILS. PER C.mm.) IN....
A
SALINE CITRATE
B
0·3% GLUCOSE + SALINE CITRATE.
RED BLOOD CELLS (MILS PER C.mm.)
WEEKS 0 1 2 3 4 0 1 2 3 4

FIG. 4

It might be thought that the marked changes in red cell fragility described are in part due to the trauma caused by daily shaking necessary to mix the blood. In order to test this point a sample of blood in saline citrate solution that had not been moved for one month was examined. The fragility curve and red cell count were strictly comparable to those obtained with six samples of blood that had been constantly mixed. The observation that red cell preservation is improved by the addition of glucose to the diluent is not new (Rous and Turner, 1916; Domanig, 1937; Durán Jordá and Aleu, 1937; Bagdassarov, 1937; Filatov, 1937). Since our experiments were begun Maizels and Whitaker (1940) have published similar findings. Our analysis of the effects on cell fragility are, however, more detailed than others available, and are therefore of interest.

Conclusions

Glucose in a final concentration of 0.1% and 1% favours the preservation of red cells in stored blood through its effect on red cell fragility.

Red cell counts on stored blood must be made using plasma as diluent.

We are indebted to J. McMichael, L. Patrick, G. Gray, and K. Stokes for help in this investigation.

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The American Museum of Health reports an unprecedented popularity for its medical and public health exhibit at the New York World's Fair. During the 1939 season seven and a half million visitors viewed this scientific exhibit.

METHODS OF FLUID ADMINISTRATION IN THE TREATMENT OF SURGICAL SHOCK

AN EXPERIMENTAL COMPARISON

BY

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The present time of battlefield and air-raid casualties gives the subject of surgical shock an ever-increasing importance.

The frequent low level of pain and the cessation of haemorrhage in severe injury are beneficial effects of shock. Individuals, however, vary in their reaction to the causes of shock: the sensitive faint "at the sight of blood," while the phlegmatic remain unmoved. In many cases shock seems needlessly severe, so that failure of the circulation and death occur.

A great number of investigations have been made in the past into the pathology and treatment of shock, and the many somewhat conflicting facts and theories argued tend to produce confusion, with the result that recognition and treatment of shock are not above criticism. It cannot be too clearly emphasized that early treatment brings its reward even in severe cases, but the neglected case of severe shock may progress to the stage of peripheral circulatory failure, and energetic treatment may then be of no avail. It was towards these severe cases of secondary shock that this investigation was directed.

Pathology of Surgical Shock

Shock is a condition of cerebral anaemia with depression of the higher centres of the brain, consequent on a reduction in volume of the active circulating blood. It is commonly divided into two clinical types.

Primary shock is due to nervous impulses, either central or peripheral in origin, which, by reflex stimulation of the vasomotor centres, cause a sudden fall in blood volume and pressure. Recovery is the rule in a comparatively short time. Some cases, however, persist with sluggish circulation, and merge gradually into secondary shock. In rare instances primary shock has been fatal.

Secondary shock may follow after an interval of a few hours or be continuous with primary shock, the symptoms increasing slowly and insidiously. It is the result of several factors acting simultaneously, all of which tend to reduce the blood volume—e.g., pain, fear, toxaemia, and shortage or loss of body fluids—as a result of haemorrhage, oedema, vomiting, sweating, and diarrhoea. It is aggravated by long exposure to cold, fatigue, the effects of certain anaesthetics, and asphyxial states. Secondary shock is to be regarded as serious because, although many cases recover spontaneously, the altered conditions of circulation may persist and gradually become worse unless treatment is prompt and efficient. Occasionally a severe state of secondary shock occurs rapidly, and is termed "collapse."

Diminished Blood Volume.—The marked fall in circulating blood volume produces a corresponding fall in arterial blood pressure. Some cases of shock may have a normal blood pressure for a short time, but this always falls as shock increases. It has been found that the larger arteries and veins are relatively empty and contracted in shock and that the heart is not filled to capacity. There is evidence to show that most of the blood remains in the vast capillary network of the body (capillaries of muscles, intestines, skin, etc.). This capillary stagnation is brought about by an active dilatation of these minute vessels. Much has been written as to the actual cause of this dilatation. It has been shown to occur experimentally by the action of toxins, histamine, or histamine-like substances. Such toxins, for instance, are absorbed in cases of burns, infections, and intestinal strangulation. It was thought until recently, after the work of Cannon, Bayliss, Dale, and others, that traumatized tissue, especially muscle, was the source of a histamine-like body. Capillary dilatation has also been shown to occur as a result of reflex nervous stimuli, as in primary shock. These nervous stimuli may be sensory—e.g., pain—or they may be central in origin—e.g., fear—and in the case of secondary shock may be long continued. The investigations of Slome and O'Shaughnessy support this view and discount tissue toxaemia as a cause of traumatic shock.

Peripheral Circulatory Failure.—As a result of capillary dilatation the volume of circulating blood is reduced in the great vessels and heart. Effects of this reduction are, first, that the vasomotor system attempts to compensate by an outpouring of adrenaline and a contraction of the arterial side of the circulation. This phenomenon may keep the blood pressure normal for a short time, but a fall in blood pressure occurs later in all cases of shock. A vicious circle is produced. The lowered blood pressure reduces the *vis a tergo* in the capillary circulation, which is also slowed as a direct result of the increased diameter of the capillaries. On account of this slow circulation the blood remains long in the capillaries and finds difficulty in reaching the veins. These are consequently poorly filled, and blood is hindered from reaching the heart. The heart is not filled to capacity and its output falls, further lowering the arterial blood pressure. Secondary effects occur as the result of stagnation of the capillary circulation: plasma passes out of the capillaries into the tissue spaces, leaving blood which is more viscid. The capillary cellular content rises: in severe cases of shock the red cell count from capillaries has been found as high as 9,000,000 per c.mm.

Anoxaemia.—Capillary blood is venous in shock, and as the result of prolonged anoxaemia the endothelium is damaged, becoming more permeable to fluids and salts. Plasma and salts enter the tissue spaces, leaving capillary blood viscid and the circulation further hindered. Other associated processes lower the volume of circulating fluids: direct loss of blood by haemorrhage (external, internal, or haematoma), and loss of body fluids locally by oedema at the site of trauma or by sweating, vomiting, and diarrhoea. The general effects of this stagnant circulation are seen in a lowered heat production, diminished basal metabolic rate, and a greatly lessened output of urine. These changes in the worst cases result in a failure of the circulation—so-called peripheral circulatory failure—and lead to death.

Spontaneous Recovery from Shock

In recovery, haemorrhage ceases owing to the favourable conditions for clotting. Rest and warmth allow the circulatory elements to recover their tone; the blood volume is restored by water drunk by the patient to alleviate thirst. With removal of the disturbing factors—pain and fright—recovery is the rule, slowly and gradually.

In this investigation a number of experiments were performed on laboratory animals with the object of comparing the results of different methods of treating traumatic shock. Cats were used in the following experiments. The animals were anaesthetized by intraperitoneal injections of urethane (1.5 grammes per kg. of body weight). A control tracing of the carotid blood pressure under this anaesthetic showed no fall in blood pressure over a period of three hours. A tracheal tube was

inserted in every animal after anaesthesia in order to eliminate variations in blood pressure due to temporary respiratory obstruction. Blood-pressure tracings were recorded by means of an indwelling carotid cannula. Shock was obtained by trauma. One hind leg of the anaesthetized animal was struck several times with a hammer. The nature of the trauma was constant, and consisted of laceration of the thigh muscles with comminution of the femur. The skin of the animal in most cases remained intact. This method of trauma was used after the manner of many early investigators. It produced a true picture of traumatic shock, the blood pressure falling on an average by 50%. In some cases the injury was augmented by movements of the injured limb until the blood pressure had fallen 50%.

These experiments were chiefly concerned with comparing methods of restoring blood pressure by the addition of fluids to the organism. In many cases the experiment was made much more severe by the formation of clot in the carotid cannula after shock had been present for some hours. Removal of the clot always produced additional haemorrhage, which in the circumstances had a serious adverse effect on the experimental animal. The use of anti-coagulants, however, was not considered advisable having regard to the method of causing shock. The animals were not allowed to regain consciousness, and were killed at the termination of each experiment. The temperature of the experimental animals was kept constant throughout.

Effect of Intravenous Infusions

1. *Normal Saline.*—Temporary recovery readily occurred on the addition of normal saline intravenously in most cases of shock. The rise in blood pressure usually lasted from a few minutes to half an hour, after which time it returned to the previous shock level or even lower. In severe shock intravenous normal saline had little or no effect whatever in raising blood pressure. These results confirm the findings of many early investigators, and are now widely accepted.

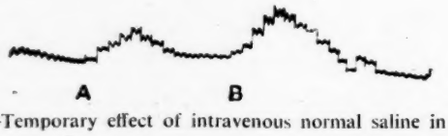

Fig. 1.—Temporary effect of intravenous normal saline in shock.

Fig. 1 shows a tracing of the carotid blood pressure of a shocked cat. Each step represents a period of two minutes. At A, 50 c.cm. of normal saline was given by the intravenous route; an immediate gradual rise in blood pressure occurred, which returned almost to the previous shock level after eighteen minutes. At B the process was repeated, with similar results.

Quantitative Limit of Intravenous Saline.—Where shock is well marked the blood pressure may have fallen 50%, and the circulating blood volume may be 60% to 70% of the normal total quantity of blood. In order to restore blood volume and pressure large quantities of normal saline would have to be given, but this fluid passes rapidly through vascular endothelium into the tissues, which explains the temporary beneficial effect. There is a practical limit, therefore, in using intravenous saline. When it is given in too large a quantity oedema of the lungs occurs. Often about 20% of the normal blood volume can be given in the early stages of shock. Cardiovascular disease, and degenerative changes in the vascular endothelium from prolonged anaemia and anoxaemia, greatly increase the risk of lung oedema.

In order to avoid cardiac failure intravenous fluids as a rule should be given slowly by the drip method. The risk of oedema of the lungs is greatest in the advanced stages of shock.

2. *Hypertonic Fluids.*—The administration of intravenous hypertonic saline in cases of shock seems to act in two ways:

(*a*) An immediate rise of blood pressure is obtained. The response is sudden, and is so marked that it bears little relation to the amount of hypertonic fluid given.

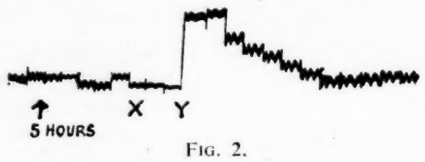

Fig. 2.

Fig. 2 is a tracing of carotid blood pressure in severe shock of five and a half hours' duration. Each step represents a five-minute period. At Y, 25 c.cm. of hypertonic 5% saline with 2% glucose solution was injected into a vein. An immediate rise of blood pressure occurred, which then fell gradually over a period of thirty-five minutes to a little above the original shock level. The pulse pressure during this period was increased, as is shown by the larger vertical depth of the tracing.

The sudden high rise in blood pressure noted in this series of experiments where intravenous hypertonic saline was given was thought to be due to a direct action on the blood vessels, probably arterioles and capillaries, causing them to contract, thus increasing the peripheral resistance of the circulation.

(*b*) The prolonged effect of intravenous hypertonic solutions in raising the blood pressure is partly due to the altered osmotic pressure of the plasma in the circulation, which causes reabsorption of tissue fluids.

Effect of Fluid Absorption by the Tissues

Water Absorption via Alimentary Canal.—In spontaneous recovery from shock water is taken to alleviate thirst and is rapidly absorbed, making up the deficient blood volume.

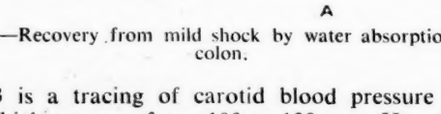

Fig. 3.—Recovery from mild shock by water absorption from colon.

Fig. 3 is a tracing of carotid blood pressure in mild shock which recovers from 100 to 130 mm. Hg. The rise in blood pressure is gradual and sustained, and of more than an hour's duration. It follows the introduction of 50 c.cm. of water into the colon at A. Blood pressure in shock can frequently be restored by water absorbed from the intestines. However, in many cases the alimentary canal does not tolerate fluids well and vomiting occurs; fluids may then be given subcutaneously.

Water Absorption via Subcutaneous Route.—Isotonic saline or glucose given by subcutaneous injection over a prolonged period restores blood volume and pressure in shock.

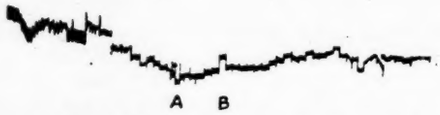

Fig. 4.—The beneficial effect of subcutaneous fluid.

Fig. 4 shows the result after normal saline was administered subcutaneously in large quantities to the shocked cat (A, B). The blood pressure rose from shock level continuously over a period of three hours; it then appeared

to be stabilized. Each step in the tracing represents a period of five minutes. This effect on the blood pressure in shock was repeatedly obtained in experiments, and contrasts remarkably with the temporary benefit on using intravenous normal saline. In certain experiments subcutaneous fluid produced no effect whatever on the blood pressure, and the animals died without showing any signs of recovery. These fatal cases of shock were always severe cases of long standing, in which the circulation was probably too stagnant for the mechanism of subcutaneous absorption to occur.

Hypotonic Saline

It has been found that hypotonic saline 0.5% when administered by the subcutaneous route is rapidly absorbed in most cases of shock, and causes an increase of blood pressure.

FIG. 5.

Fig. 5 is a tracing of carotid blood pressure in the shocked cat. Each step represents a five-minute period. At A, 300 c.cm. of 0.5% saline was given subcutaneously and caused a gradual sustained rise of blood pressure over a period of seventy minutes and with evidence of continuing.

This result was typical of all but the most severe cases of shock; in these, absorption from the tissues appeared to be absent.

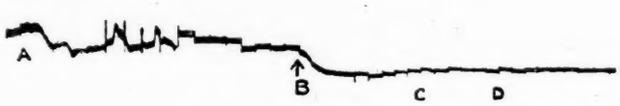

FIG. 6.

Fig. 6 is a tracing of carotid blood pressure in severe shock. Each step represents a five-minute period. At A trauma was followed by a moderate fall in blood pressure over an hour; further injury at B caused a pronounced fall, which was maintained. At C, 100 c.cm. of 0.5% saline was injected subcutaneously; 200 c.cm. was also injected at D, but the blood pressure was not altered.

The Osmotic Gradient

From these results it is seen that the state of shock may be benefited by the addition of fluid to the circulation. Temporary effects are to be expected by giving intravenous normal saline, but far more prolonged raising of the blood pressure occurs by the absorption of water from intestines or saline from the subcutaneous tissues. It is probable, however, that in the severest cases the circulation is too stagnant for absorption of subcutaneous fluids or intestinal contents to occur. In these conditions it is possible to stimulate the circulation by intravenous addition of hypertonic fluids and so enable water to be absorbed by osmosis from tissues or intestines.

In Fig. 2 (a tracing of carotid blood pressure in severe shock of five and a half hours' duration), at X, 200 c.cm. of hypotonic 0.5% saline was given subcutaneously with no benefit, after fifteen minutes, to the blood pressure. At Y, 25 c.cm. of hypertonic 5% saline and glucose 2% was injected into a vein, with an immediate high rise of blood pressure. A gradual fall occurred in the following thirty-five minutes, but the blood pressure began to rise steadily and gradually from this point for a further twenty-five minutes owing to osmotic absorption.

The increased osmotic pressure of the active circulation brings about absorption of tissue fluids of lower osmotic pressure: an osmotic gradient is present. Such a condition can be maintained artificially by slow intravenous drip of hypertonic saline coincident with the provision of an adequate fluid reserve in the tissues. The use of hypotonic saline 0.5% for a fluid reserve as well as the administration of water by natural channels would seem to be a logical method of preserving this osmotic gradient. On many occasions hypotonic saline measuring more than twice the normal blood volume was given subcutaneously without causing oedema of the lungs in the experimental animal; whereas normal saline amounting to a fraction of the normal blood volume given directly into a vein might produce this complication, although the heart appeared to be beating strongly.

Summary

Some methods of replacing fluids in the shocked experimental animal are compared.

The temporary beneficial effect of intravenous saline in shock is again shown.

Hypertonic saline given intravenously directly stimulates the circulation in shock. The rise in blood pressure is probably prolonged by osmotic absorption of tissue fluids also.

Fluids absorbed by the capillary circulation from intestines or subcutaneous tissues may restore blood pressure permanently in shock.

No absorption occurs by capillaries in severe shock.

Some evidence is brought to show that hypotonic saline may be absorbed by the tissues in severe shock and produce a sustained rise of blood pressure when the circulation is stimulated by hypertonic saline and an osmotic gradient is maintained.

The clinical application of the above principles of fluid administration is proceeding. Up to the present several cases of severe shock have been successfully treated, and in one instance the blood pressure recovered from the low level of 30 mm. Hg.

I wish to acknowledge my grateful thanks to Professor Pannett, director of the Surgical Unit, St. Mary's Hospital, for his kind encouragement and advice during the preparation of this paper.

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Local education authorities have been asked to provide instruction in simple first-aid measures for older boys and girls, the instruction being given where possible by teachers on the school staff holding recognized certificates. Where no such teacher is available it may be possible to obtain suitably qualified instructors through the local A.R.P. authority. A Board of Education circular to this effect states that instruction should be given on simple dressings, burns, arrest of haemorrhage, artificial respiration, and, in general, how to render such immediate help as will prevent further injury.

USE OF SULPHUR-CONTAINING COMPOUNDS, PARTICULARLY PENTOTHAL SODIUM, IN CONJUNCTION WITH SULPHAPYRIDINE

BY

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It has been said that sulphapyridine should not be given to a patient if he has recently received pentothal sodium for the induction of anaesthesia, and, conversely, that a patient under treatment with sulphapyridine must not be given pentothal sodium. This prohibition may be inconvenient in both directions because subsequent to an operation during which pentothal has been employed it may become advisable to start sulphapyridine therapy for some unexpected infective complication. On the other hand, a patient with a large infected wound who is receiving sulphapyridine might well be given some pentothal for the first dressings or for opening of abscesses, etc.

In April, 1940, a soldier (Case 1) was admitted to this hospital with a history suggestive of acute perforation of a peptic ulcer some fourteen hours before. The peritoneal cavity was found to be full of thick pus, and his condition appeared to be so desperate, as so long a time had elapsed since the perforation, that it was obviously necessary to employ every means at our disposal to combat the infection. Having decided to give him sulphapyridine intravenously during the operation I then discovered that he had just received 1.75 grammes of pentothal (containing some 3 grains of sulphur) intravenously for the induction and maintenance of anaesthesia. Despite this I felt that we must proceed, and he was given 1 gramme of sulphapyridine intravenously while still on the operating table. He made an amazingly rapid recovery in every way, and in particular there were no complications that could be attributed to the administration of sulphapyridine together with pentothal.

Shortly afterwards casualties from France and Belgium began to arrive in large numbers. In one convoy there were many cases of gas gangrene as well as other infections. Sulphapyridine was given to very large numbers of men, and indeed some had received it before admission, both for gas gangrene and for other infective conditions. Pentothal was widely used by certain anaesthetists here for the induction of anaesthesia, and sometimes throughout the operation as well. It seemed worth while taking the risk of administering sulphapyridine to every case needing it, exactly in the same way as if no pentothal had been given. Table I shows seven cases in which anaesthesia had been produced by pentothal either alone or with other anaesthetic substances and in which sulphapyridine was given intravenously during the operation. Table II shows two further cases which received sulphapyridine intravenously within twenty-four hours of operation. In all cases medication was continued by mouth.

TABLE I.—*Cases Receiving Sulphapyridine Intravenously at End of Operation*

Case No.	Date of Operation	Amount of Sulphapyridine I.V.	Amount of Pentothal I.V.
1	8/4/40	1 gramme	1.75 grammes
2	25/5/40	1 ,,	0.3 gramme
3	28/5/40	1 ,,	0.5 ,,
4	27/5/40	1 ,,	0.5 ,,
5	24/6/40	1 ,,	0.5 ,,
6	4/7/40	1 ,,	0.5 ,,
7	4/7/40	1 ,,	0.5 ,,

Other cases were taking sulphapyridine by mouth when an anaesthetic became necessary, and these were given pentothal, therefore, at a time when their blood had a high concentration of sulphapyridine. Patients falling into this group were those given sulphapyridine on admission while awaiting operation; and those taking sulphapyridine after a first operation who developed complications requiring further operation under anaesthesia. At the time of the evacuation from Dunkirk this hospital received several hundred cases in the space of a few days, so that many large dressings, removals of tubes, etc., had to be done in a short time. Not enough portable gas apparatuses were available, and the difficulty was met by organizing teams consisting of one R.M.O. and students who went round the wards giving pentothal for these dressings. In these cases all were treated alike whether they had had sulphapyridine or not. Table III shows cases taking sulphapyridine by mouth when they received pentothal. Table IV shows cases which were not receiving sulphapyridine at the time of operation but had it within the next twenty-four hours; and Table V those cases which began their sulphapyridine within three days of the receipt of pentothal.

TABLE II.—*Cases Receiving Sulphapyridine Intravenously within 24 Hours of Operation*

Case No.	Date of Operation	Amount of Sulphapyridine I.V.	Amount of Pentothal I.V.
8	3/6/40	1 gramme	0.5 gramme
9	4/6/40	1 ,,	0.5 ,,

TABLE III.—*Cases Receiving Sulphapyridine Orally at Time of Operation*

Case No.	Date of Operation	Amount of Sulphapyridine by Mouth	Amount of Pentothal I.V.
10	24/5/40	Wound pack	0.5 gramme
11	25/5/40	8 grammes	0.5 ,,
12	25/5/40	8 ,,	0.5 ,,
13	26/5/40	15 ,,	0.5 ,,
14	27/5/40	6 ,,	0.5 ,,
15	28/5/40	6 ,,	0.75 ,,
16	2/6/40	8 ,,	0.75 ,,
17	4/7/40	8 ,,	0.5 ,,

TABLE IV.—*Cases Receiving Sulphapyridine Orally within 24 Hours of Operation*

Case No.	Date of Operation	Amount of Sulphapyridine by Mouth	Amount of Pentothal I.V.
18	25/5/40	6 grammes	0.5 gramme
19	25/5/40	12 ,,	0.5 ,,
20	25/5/40	8 ,,	0.5 ,,
21	27/5/40	14 ,,	0.5 ,,
22	28/5/40	14 ,,	0.5 ,,
23	28/5/40	6 ,,	0.5 ,,
24	30/5/40	6 ,,	0.5 ,,
25	2/6/40	6 ,,	0.5 ,,
26	19/6/40	6 ,,	0.5 ,,

TABLE V.—*Cases Receiving Sulphapyridine Orally within Three Days of Operation*

Case No.	Date of Operation	Amount of Sulphapyridine by Mouth	Amount of Pentothal I.V.
27	14/5/40	6 grammes	0.5 gramme
28	27/5/40	6 ,,	0.5 ,,
29	31/5/40	6 ,,	0.33 ,,
30	25/6/40	6 ,,	0.5 ,,

Pentothal sodium contains 12% of sulphur. Case 1 therefore received over 3 grains of sulphur direct into his veins and within half an hour was given 1 gramme of sulphapyridine intravenously. Such a concentration of sulphur in the blood would surely never be reached by a diet containing many eggs and onions. I have been unable to discover how long the sulphur of pentothal remains in the body. Even Abbotts, the manufacturers of pentothal, had no information available in this country concerning that point. As it may be that the sulphur is excreted rapidly, no case has been recorded which was not receiving sulphapyridine within seventy-two hours of operation. The combination of drugs has been given to

very many more patients than the thirty here reported, but for certain reasons it is only possible at the moment to have access to the complete notes, with medicine cards, of these thirty. Both in the recorded cases and in the more numerous unrecorded ones there have been no complications other than the usual nausea and vomiting, and the incidence of the latter would appear to be lower rather than higher than that always experienced in any series of cases treated with sulphapyridine. There has been no cyanosis whatever.

Magnesium sulphate and saline purgatives in general have been forbidden to cases receiving sulphapyridine or prontosil, as such a combination is said to cause cyanosis. If this is really so it is again unfortunate, because there are certain types of case requiring both drugs. I refer particularly to those frequent cases of head injury in which there is both an actual or a potential infection of the brain or scalp and the existence of a state of high intracranial pressure due to oedema and congestion of the brain. Perhaps less important in war are those cases of high pressure due to cerebral tumour, etc., which develop an infection—for example, a pneumonia after operation. These cases require sulphapyridine for their infection and also magnesium sulphate by various routes for cerebral dehydration. Both at the National Hospital for Nervous Diseases, London, and at Horton I have dehydrated such patients by oral and rectal magnesium sulphate during sulphapyridine medication without anything untoward arising.

This short paper has been written because it is felt that patients receiving sulphapyridine can safely be given pentothal and magnesium sulphate at the same time. Although this is not directly concerned with the matter of diet one is caused to wonder whether various sulphur-containing foods, such as eggs, need be withheld from the now very numerous patients receiving sulphapyridine.

USE OF PROFLAVINE AND ACRIFLAVINE IN A THROAT AND NOSE DEPARTMENT

BY

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Various preparations of proflavine and acriflavine have been widely used as antiseptics for a number of years now. Although much has been written about them we consider that our experience of the application of some of these to certain phases of the work of a throat and nose department is encouraging enough to warrant a brief communication. We shall confine ourselves to two of the most striking examples of the efficacy of these antiseptics. One refers to a special method of treatment of a malignant condition from which septic complications have now been eliminated, and the other to the prevention of post-operative scarlet fever such as is encountered from time to time in these special wards.

Malignant Tumours of Accessory Nasal Sinuses

In a previous communication one of us described the definite place which proflavine oleate had come to occupy in certain spheres of radium therapy (Charteris, 1937). Among those only briefly mentioned then was the treatment of malignant tumours of the accessory nasal sinuses, for which experience has led us to favour as a rule exploration of the affected part combined with cavitary application of radium. The antrum is opened by the Caldwell-Luc method and the tumour tissue scooped out. Any invasion of the bony walls is noted, and the antro-nasal wall removed if necessary. In almost every case the operation is carried on so as to throw the antrum, ethmoid cells, and even the sphenoid sinus into one more or less regular cavity: this procedure, though extensive, is not dangerous, and enables one to see clearly how far the gross disease has progressed. Into the convenient cavity so formed a series of radium applicators of known output is placed, and held in position with packing. We do not intend here to say anything of the method except that a uniform dosage can be obtained, giving excellent results. The applicators are left undisturbed for seventy-two hours, and the parts therefore tend to become very septic and foul, causing the patient much distress. Moreover, various septic complications may ensue; the most important of these is localized osteomyelitis. We have not observed meningeal infection. Before the employment of proflavine oleate in 1936 sepsis constantly ensued, and, although rarely so serious as to threaten life, gave rise to unnecessary suffering and retarded convalescence, probably also interfering with the response of the tumour to the radium treatment. Soaking of the packing in proflavine oleate (1% in liquid paraffin) at once ended all gross sepsis where other procedures had failed. The patients now have very little discomfort, the temperature never shows more than the usual transient reactionary rise of about 1° F. on the day after operation, and not only does the packing come away without sticking but it is reasonably clean and almost free from objectionable odour. No local or other complications have followed treatment since then, even where the field has been very extensive, nor have the usual troublesome crusts formed afterwards in the affected zone. So remarkable a result, maintained over four years now, may well suggest other uses of this material in cases in which a temporarily closed cavity must be kept clean. It is not necessary to stress the importance of combating infection in a region subjected to radiation in dosage adequate to deal with malignancy.

Prevention of Post-operative Scarlet Fever

The second way in which such a preparation has been helpful is concerned with the prevention of infectious disease in throat and nose wards. Many of the cases are inevitably complicated by local sepsis, and the occasional occurrence of infectious disease after operation is a general experience: the chief difficulty is with post-operative scarlet fever. Such infections are not only unfortunate from the patient's point of view, but cause disorganization, since the ward affected has to be closed for a suitable period. Some six years ago the routine was established of giving all patients a mouth-wash and gargle of watery acriflavine 1 in 5,000 twice daily: this was started immediately on admission and was continued throughout the stay in hospital. Before the introduction of this simple measure one of the throat, nose, and ear wards had been closed no fewer than thirteen times during the preceding winter, and this was by no means an exceptional frequency, but since then the two wards have not had more than a total of five cases of post-operative scarlet fever up to date. This practical proof of the efficacy of acriflavine is not less striking than the first example when one realizes that the change is due entirely to a single procedure of extreme simplicity, and that the good result has also been maintained over a period of years.

We acknowledge with pleasure the help and advice given us by Prof. C. H. Browning.

REFERENCE

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Clinical Memoranda

A Case of Tsutsugamushi (Rural Typhus) in Ceylon

The urban and rural forms of tropical typhus are diseases of rodents. They are caused by two species of Rickettsia: the former is carried by the rat flea (*Xenopsylla cheopis*) and the latter by larval mites. These infections have been recorded from various countries in the Far East, and it has been known for some years that both forms occur in Ceylon. The diagnosis of urban typhus has been confirmed in two cases by the Weil-Felix reaction with *B. proteus* X19, and by the intraperitoneal inoculation of guinea-pigs with the patients' blood being followed by scrotal swelling and the presence of Rickettsia bodies in smears from the tunica vaginalis. In 1937 Dr. L. B. E. Seneviratne examined the blood of 434 patients in provincial hospitals for the Weil-Felix reaction, and six were found to be positive with *B. proteus* XK in dilutions of 1 in 250 or more.

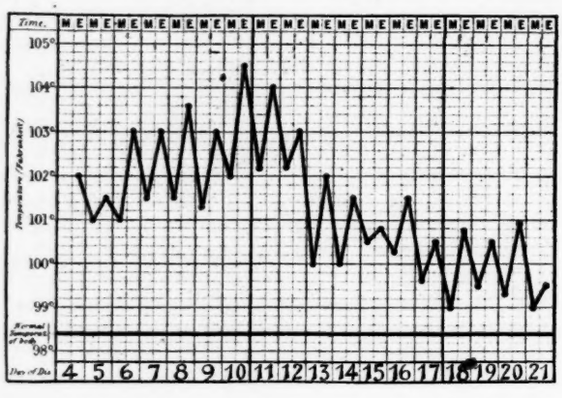
Most cases of tropical typhus have occurred in the provinces, where it is difficult to make satisfactory studies, but recently a case in a European has provided the opportunity for a detailed study.

Case Report

A male European aged 37, who was resident in Colombo, went on a holiday to the east coast of Ceylon. He spent some of his time shooting, and on one occasion when waiting for a flight of teal lay prone upon the ground. Ten days after he had returned to Colombo he became ill, with headache and low fever, but before this he had noticed two itching "spots," one on the inner side of each thigh.

When seen on the fourth day of the fever the patient complained of severe headache and sleeplessness. The temperature was 102°. There was an erythematous rash over the whole body and on the face and neck; the only parts not affected were the palmar and plantar surfaces. On the inner side of each thigh was a black eschar about a quarter of an inch in diameter surrounded by a raised area of red areola extending away from the eschar for about a quarter of an inch. The glands in the groins were enlarged but not markedly tender, and there appeared to be slight lymphangitis extending to these from the eschars. The pulse was 90.

On the sixth day blood was taken for the Weil-Felix reaction, and was found to be positive to a 1 in 250 dilution with *B. proteus* XK. The temperature slowly increased (see chart),



and the severe headache continued. On the eighth day morphine and atropine were given for persistent hiccup, which necessitated further treatment from the tenth to the twelfth day for its control. The skin eruption became more pronounced, and did not begin to fade until the thirteenth day. The conjunctivae were considerably injected from the sixth day onwards. The glands in the axillae were slightly swollen, and there was some splenic enlargement. The pulse became rapid, rising to 130 on the tenth day. From the tenth to the twelfth day the patient was very ill indeed.

On about the tenth day small ulcers appeared in the mouth, along the edge of and under the tongue, and these did not completely clear up until fourteen days later. Soreness on swallowing indicated that there was also oesophagitis; this had not entirely disappeared a month later. The temperature fell slowly, but not until the twenty-ninth day was the patient completely free of pyrexia. Agglutination of *B. proteus* XK by the blood serum rose to 1 in 500 by the twelfth day, but did not rise above this. The patient lost 2 st. in weight, and convalescence was very prolonged.

Commentary

Fletcher, Lesslar, and Lewthwaite (1929) considered that tsutsugamushi disease could be separated from rural typhus because: (1) the fever of tsutsugamushi does not terminate abruptly at the end of the second week as it does in rural typhus; (2) a primary sore (eschar) and bubo are present in tsutsugamushi but not in rural typhus; (3) the titre of agglutination with *B. proteus* XK is low in tsutsugamushi but very high in rural typhus.

The work of Lewthwaite and Savoor (1936) in Malaya has shown that tsutsugamushi and rural typhus are manifestations of infection by one and the same species of Rickettsia, and therefore the former name has priority.

My thanks are due to Dr. P. J. Chissell for permission to publish this case.

Lucius Nicholls, M.D.Cantab.
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Three Cases of Dyspituitarism in One Family

In the *Journal* of February 9, 1935 (p. 252), I described a case of dyspituitarism of Fröhlich's type. This boy has now reached the age of 8½; he weighs just under 13 st., and is 4 ft. 4½ in. in height. But what is more remarkable, two other brothers suffering from the same condition have since been born. The accompanying photograph shows the whole family, with their ages and weights. All these children enjoy

Name	*Mother*	*Ronald*	*Mary*	*Kenneth*	*Leslie*	*Reggie*	*Doris*
Age (y. mths.)	38.9	11 mths.	3.4	5.3	8.6	10.6	12
Weight (st. lb.)	9.10	3.6	2.2	8.2	12.13	4.10	4.5

very good health and play about like ordinary children so far as their enormous bulk will allow. They are mentally bright, although it is increasingly difficult to clothe and educate them. East Anglians are a hardy race, but these children wear very few clothes indeed. They show all the usual signs of this condition—a great increase of adipose tissue, small hands and feet, very undeveloped genital organs, soft skin, and thin hair. Radiographs reveal no abnormality in the long bones, but the sella turcica is ill defined and the clinoid processes are not well marked. There was considerable difficulty in getting clear negatives of these big heads. Any suggestions as to pathology of this condition and its control would be most welcome. There is a vague history that the mother's aunt was very fat when young, but became normal at puberty.

Up to now the parents have refused their admission to hospital. It seems remarkable that all these children should have cysts or tumours near their pituitary glands.

Lowestoft. Dudley W. Boswell, M.D., D.P.H., T.D.

Reviews

DIETETICS: SCIENCE AND PRACTICE

A Textbook of Dietetics. By L. S. P. Davidson, M.D.Ed., F.R.C.P.Lond. and Ed., and Ian A. Anderson, M.B., Ch.B.Aberd. With diet sheets constructed by Miss Mary E. Thomson, S.R.N., and a foreword by Sir John Boyd Orr, M.D., F.R.S. (Pp. 324. 10s. 6d.) London: Hamish Hamilton Medical Books. 1940.

The practical science of dietetics has lagged rather painfully behind the advance of the laboratory worker. In the latter half of the nineteenth century the role of the three foodstuffs was determined and the quantitative aspect of diet generally agreed, but the qualitative aspect was not really studied until the second decade of the present century. Consequently the simultaneous introduction of margarine in its original form and of the roller-milling of cereals may be said to be chiefly responsible for a dark page in the nation's dietary history the cause of which was not then appreciated. In disease, as Sir William Roberts complained more than half a century ago, dietetic restrictions were imposed which were traditional rather than scientific. To-day there is no excuse for such things, and the *Textbook of Dietetics* by Prof. Stanley Davidson and Dr. I. A. Anderson provides an admirable guide to the science and practice of the subject.

Two special characteristics enhance its value: in the first place everything is referred back to first principles; and, in the second, tradition unsupported by evidence is swept remorselessly aside for rational schemes based on those principles and on personal experience. Mention should also be made of the very useful diet sheets constructed by Sister Mary Thomson, which occupy sixty-six pages and which are full of practical wisdom. The keynote of the book is struck in the preface in these words: "No dietetic restriction should be imposed that cannot be justified on biochemical, physiological, or clinical grounds. To withhold much-desired food on no better sanction than fashion or tradition not only discredits the practice of dietetics but may inflict misery and harm." The plan of the book is to deal with (1) a survey of diets at various income levels; (2) the physiology of nutrition; (3) diet in health, particularly in periods of stress; (4) dietetic treatment of disease.

The profession is already much indebted to Prof. Stanley Davidson for his discovery of the high vitamin content of halibut oil and his demonstration that the majority of women in the poorer classes live on the verge of an easily remediable iron starvation. The characteristics of his earlier work are also manifest here. There is the same careful collection of facts, freshness of outlook, common sense, and lucid exposition. We might specify the chapter on the treatment of nephritis as an outstanding example of his method. It is of particular interest to note the way in which the newer knowledge is brought to the explanation of well-known clinical facts. Thus the danger of haemorrhage in operations on patients with obstructive jaundice has long been recognized. Now we know that the failure to absorb fat which is typical of jaundice brings with it a failure to absorb the fat-soluble vitamin K; consequently the level of prothrombin in the blood falls and a haemorrhagic tendency develops. We are clearly shown the responsibility of hypovitaminosis for vague states of ill-health, and the recently recognized danger of treating chronic diseases by necessarily restricted diets without reference to this factor. On the other hand, it is reassuring to be told that the idea that vitamin D is toxic if given in large doses is erroneous, being based on the use of crude products containing toxic substances allied to vitamin D but having no antirachitic properties. We were a little surprised, however, to find no mention of the value of vitamin A in the prophylaxis of renal calculus; indeed, in view of Swift Joly's dictum that diet is the most important single aetiological factor in calculus formation, the discussion of this subject seems the only one that is not quite adequate. The whole subject of mineral metabolism in disease, another qualitative aspect of increasing importance, is, on the other hand, fully and helpfully discussed.

To read this book is to realize how fundamentally our ideas on diet in health and disease have been modified in the last twenty years, thanks to co-operation between pure chemists, biochemists, and clinicians. Such co-operation is not only essential in these days of increasing specialism, but is fruitful in itself. Here that fruit is attractively displayed; to fail to read this book is to miss an interesting experience and to lose a valuable guide to the complexities of dietetic treatment.

CLINICAL ELECTROCARDIOGRAPHY

Clinical Electrocardiography. By David Scherf, M.D., and Linn J. Boyd, M.D., F.A.C.P. (Pp. 362. 25s. net.) London: William Heinemann (Medical Books) Ltd. 1940.

Books on electrocardiography continue to appear at short intervals, but it cannot be said that this one on clinical electrocardiography by Scherf and Boyd is superfluous; it is not merely a re-hash of old work, but contains a great deal of information which treats largely of the advances of the last few years. Although a paragraph in the preface suggests that there are now more important uses for the electrocardiograph than the diagnosis of arrhythmias, we nevertheless find that about half the book is devoted to them; extrasystoles are, for example, described in thirty-eight pages, whereas coronary thrombosis occupies only eight. A reversal of the space devoted to these two subjects would be more in keeping with their relative importance. The authors follow the German school in the theory of the mechanism of auricular fibrillation and flutter, rejecting that of circus movement, though they now admit that the mechanism must differ from that of paroxysmal tachycardia. On the subject of bundle branch block a non-committal attitude is adopted towards the new nomenclature and to the theories which attempt to bring axis deviation into line with this.

The illustrations are numerous and clear enough for interpretation without being always of that good quality which gives so much pleasure to the expert. In some cases, it appears to the reviewer, the figures are inaccurately described, and there are a number of typographical errors in the text. The book deserves more careful proof-reading, for the more advanced student and expert will find something of interest on every page.

INDIGENOUS DRUGS OF INDIA

Indigenous Drugs of India. Their Scientific Cultivation and Manufacture. With Numerous Suggestions Intended for Educationists and Capitalists. By J. C. Ghosh, B.Sc. With a foreword by Colonel R. N. Chopra, C.I.E., K.H.P., M.A., M.D., Sc.D., F.R.C.P., I.M.S. (ret.). Second edition, revised and enlarged. (Pp. 244. Rs. 3 net, postage extra; 5s. 6d. post free). Calcutta: P. K. Ghosh, School of Chemical Technology. 1940.

The first edition of this book was published in 1919, when the author drew attention to the desirability of India's making fuller use of her indigenous drugs to replace the supplies of foreign drugs that had been rendered unobtainable by the war. In a second and enlarged edition he deals with the same problem, which has once again cropped up. India has an extraordinarily rich supply of vegetable drugs. Mr. Ghosh states that half the drugs of vegetable origin included in the *British Pharmacopoeia* are indigenous to India and that nearly all the *B.P.* drugs could be grown there. India exports large quantities of important drugs such as senna, but

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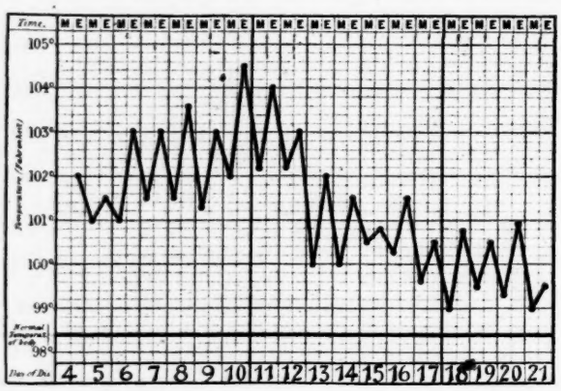
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Normal Temperature of body
Date of Dis.
4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

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LUCIUS NICHOLLS, M.D.Cantab.
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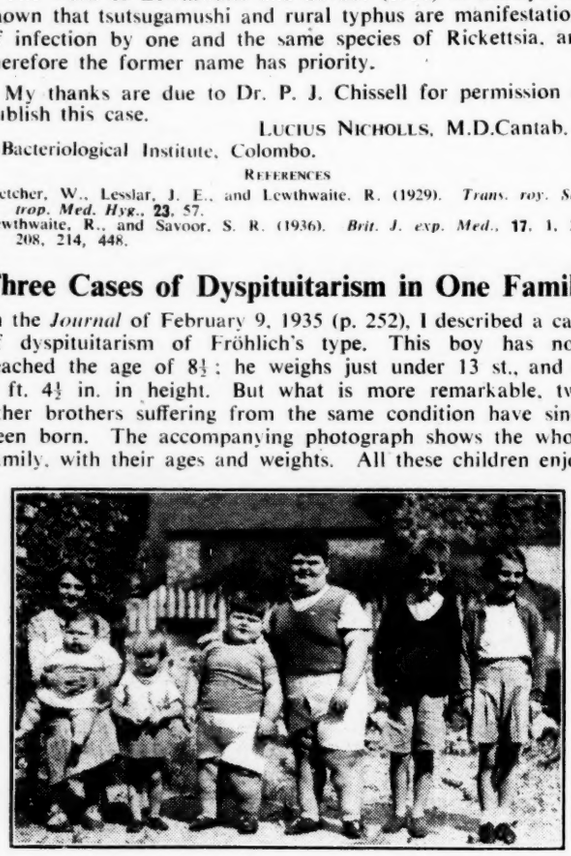

Name	*Mother*	*Ronald*	*Mary*	*Kenneth*	*Leslie*	*Reggie*	*Doris*
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Reviews

DIETETICS: SCIENCE AND PRACTICE

A Textbook of Dietetics. By L. S. P. Davidson, M.D.Ed., F.R.C.P.Lond. and Ed., and Ian A. Anderson, M.B., Ch.B.Aberd. With diet sheets constructed by Miss Mary E. Thomson, S.R.N., and a foreword by Sir John Boyd Orr, M.D., F.R.S. (Pp. 324. 10s. 6d.) London: Hamish Hamilton Medical Books. 1940.

The practical science of dietetics has lagged rather painfully behind the advance of the laboratory worker. In the latter half of the nineteenth century the role of the three foodstuffs was determined and the quantitative aspect of diet generally agreed, but the qualitative aspect was not really studied until the second decade of the present century. Consequently the simultaneous introduction of margarine in its original form and of the roller-milling of cereals may be said to be chiefly responsible for a dark page in the nation's dietary history the cause of which was not then appreciated. In disease, as Sir William Roberts complained more than half a century ago, dietetic restrictions were imposed which were traditional rather than scientific. To-day there is no excuse for such things, and the *Textbook of Dietetics* by Prof. Stanley Davidson and Dr. I. A. Anderson provides an admirable guide to the science and practice of the subject.

Two special characteristics enhance its value: in the first place everything is referred back to first principles; and, in the second, tradition unsupported by evidence is swept remorselessly aside for rational schemes based on those principles and on personal experience. Mention should also be made of the very useful diet sheets constructed by Sister Mary Thomson, which occupy sixty-six pages and which are full of practical wisdom. The keynote of the book is struck in the preface in these words: "No dietetic restriction should be imposed that cannot be justified on biochemical, physiological, or clinical grounds. To withhold much-desired food on no better sanction than fashion or tradition not only discredits the practice of dietetics but may inflict misery and harm." The plan of the book is to deal with (1) a survey of diets at various income levels; (2) the physiology of nutrition; (3) diet in health, particularly in periods of stress; (4) dietetic treatment of disease.

The profession is already much indebted to Prof. Stanley Davidson for his discovery of the high vitamin content of halibut oil and his demonstration that the majority of women in the poorer classes live on the verge of an easily remediable iron starvation. The characteristics of his earlier work are also manifest here. There is the same careful collection of facts, freshness of outlook, common sense, and lucid exposition. We might specify the chapter on the treatment of nephritis as an outstanding example of his method. It is of particular interest to note the way in which the newer knowledge is brought to the explanation of well-known clinical facts. Thus the danger of haemorrhage in operations on patients with obstructive jaundice has long been recognized. Now we know that the failure to absorb fat which is typical of jaundice brings with it a failure to absorb the fat-soluble vitamin K; consequently the level of prothrombin in the blood falls and a haemorrhagic tendency develops. We are clearly shown the responsibility of hypovitaminosis for vague states of ill-health, and the recently recognized danger of treating chronic diseases by necessarily restricted diets without reference to this factor. On the other hand, it is reassuring to be told that the idea that vitamin D is toxic if given in large doses is erroneous, being based on the use of crude products containing toxic substances allied to vitamin D but having no antirachitic properties. We were a little surprised, however, to find no mention of the value of vitamin A in the prophylaxis of renal calculus; indeed, in view of Swift Joly's dictum that diet is the most important single aetiological factor in calculus formation, the discussion of this subject seems the only one that is not quite adequate. The whole subject of mineral metabolism in disease, another qualitative aspect of increasing importance, is, on the other hand, fully and helpfully discussed.

To read this book is to realize how fundamentally our ideas on diet in health and disease have been modified in the last twenty years, thanks to co-operation between pure chemists, biochemists, and clinicians. Such co-operation is not only essential in these days of increasing specialism, but is fruitful in itself. Here that fruit is attractively displayed; to fail to read this book is to miss an interesting experience and to lose a valuable guide to the complexities of dietetic treatment.

CLINICAL ELECTROCARDIOGRAPHY

Clinical Electrocardiography. By David Scherf, M.D., and Linn J. Boyd, M.D., F.A.C.P. (Pp. 362. 25s. net.) London: William Heinemann (Medical Books) Ltd. 1940.

Books on electrocardiography continue to appear at short intervals, but it cannot be said that this one on clinical electrocardiography by Scherf and Boyd is superfluous; it is not merely a re-hash of old work, but contains a great deal of information which treats largely of the advances of the last few years. Although a paragraph in the preface suggests that there are now more important uses for the electrocardiograph than the diagnosis of arrhythmias, we nevertheless find that about half the book is devoted to them; extrasystoles are, for example, described in thirty-eight pages, whereas coronary thrombosis occupies only eight. A reversal of the space devoted to these two subjects would be more in keeping with their relative importance. The authors follow the German school in the theory of the mechanism of auricular fibrillation and flutter, rejecting that of circus movement, though they now admit that the mechanism must differ from that of paroxysmal tachycardia. On the subject of bundle branch block a non-committal attitude is adopted towards the new nomenclature and to the theories which attempt to bring axis deviation into line with this.

The illustrations are numerous and clear enough for interpretation without being always of that good quality which gives so much pleasure to the expert. In some cases, it appears to the reviewer, the figures are inaccurately described, and there are a number of typographical errors in the text. The book deserves more careful proof-reading, for the more advanced student and expert will find something of interest on every page.

INDIGENOUS DRUGS OF INDIA

Indigenous Drugs of India. Their Scientific Cultivation and Manufacture. With Numerous Suggestions Intended for Educationists and Capitalists. By J. C. Ghosh, B.Sc. With a foreword by Colonel R. N. Chopra, C.I.E., K.H.P., M.A., M.D., Sc.D., F.R.C.P., I.M.S. (ret.). Second edition, revised and enlarged. (Pp. 244. Rs. 3 net, postage extra; 5s. 6d. post free). Calcutta: P. K. Ghosh, School of Chemical Technology. 1940.

The first edition of this book was published in 1919, when the author drew attention to the desirability of India's making fuller use of her indigenous drugs to replace the supplies of foreign drugs that had been rendered unobtainable by the war. In a second and enlarged edition he deals with the same problem, which has once again cropped up. India has an extraordinarily rich supply of vegetable drugs. Mr. Ghosh states that half the drugs of vegetable origin included in the *British Pharmacopoeia* are indigenous to India and that nearly all the *B.P.* drugs could be grown there. India exports large quantities of important drugs such as senna, but

in most cases actually fails to supply her own needs. The most striking example of such failure is that of quinine. India uses 200,000 lb. a year, and needs at least 600,000 lb., but the Indian production is only 70,000 lb.

Discussing the steps necessary to make India self-supporting in the matter of drugs of vegetable origin, Mr. Ghosh declares that a big co-ordinated effort is needed. First, the cultivation of drugs must be organized, and, secondly, large-scale manufacture is essential, because processes such as the extraction of alkaloids on a commercial scale involve difficult techniques, many of which are trade secrets. In regard to the purification of drugs the important point arises that the Indian population must be provided with drugs at the lowest possible cost. In Europe the prime cost of the drug is usually only a small fraction of the price at which it is sold, and hence more attention is paid to obtaining the purest possible product than to keeping the cost of production as low as possible. This practice has, for example, led to the use of pure quinine salts in preference to the mixed cinchona alkaloids, though the latter are much cheaper, and the most urgent Indian need is for the cheapest effective anti-malarial.

The first step towards improving the home production of drugs in India is to establish control over the sale of drugs. Mr. Ghosh points out that the absence of adequate pharmacy laws makes it impossible to enforce any standards regarding the quality of drugs sold to the public. The general thesis of his book is that if adequate use were made of the drugs provided by Nature in India the country could be saved a large sum of money and the health of the people greatly improved. Such a development requires, however, a large-scale organization of the growth and manufacture of drugs and the institution of adequate legal control over their sale. Finally he touches on the need for more research on the properties of the lesser-known Indian drugs, and pays a tribute to the work already done in this connexion by Colonel Chopra and his institute.

CONDITIONING AND LEARNING

Conditioning and Learning. By Ernest R. Hilgard and Donald G. Marquis. The Century Psychology Series; Richard M. Elliott, Editor. (Pp. 429. 15s. net.) New York and London: D. Appleton-Century Company Incorporated.

The work of Pavlov and his associates has earned a well-deserved reputation among physiologists as a remarkable advance in our knowledge and understanding of the functions of the central nervous system, but the temptation to assume that the application of simple principles will explain complex processes was not resisted even by Pavlov himself, since he was led away into formulating a theory of normal personality and of pathological psychiatric reactions on the basis of the behaviour of his so-called neurotic dogs. Similarly others have attempted to formulate theories of learning on a basis of conditioning and nothing else. That the knowledge gained from a study of conditioning has a material application to the understanding of the learning process no one will deny, but, as the authors point out in this excellent critical survey, we are only at the beginning of the study, and conceptions founded on relatively simple neurophysiological experiments must not be pushed too far and too rashly into the realm of psychology, nor must we assume without further experimental evidence that certain neurophysiological processes give us a complete correlation between brain function and behaviour. Nevertheless the pursuit of neurophysiology will clarify many psychological problems, and the host of American and other workers who are checking and extending the Pavlovian experiments are doing excellent service to the advance of knowledge.

The book is rather for the expert, but is furnished with a glossary of terms which, however, is not likely to enable the uninstructed to read it with much understanding. A valuable and full bibliography is added of nearly 1,000 references.

Notes on Books

We welcome a second edition of *Modern Dietary Treatment* by Miss M. Abrahams and Miss E. M. Widdowson, as it provides at a reasonable price the most comprehensive manual for use in the diet kitchen and the consulting-room in this country. The tables have always been a strong point, and they have been revised in accordance with McCance and Widdowson's recent monograph on the *Chemical Composition of Foods.* We wish every medical student could be taught to use this book, as it gives all the information required in the average case and, in addition, it provides a key to the literature for more fundamental or recondite material. It is published at 10s. 6d. by Baillière, Tindall and Cox.

The Standing Committee on Laboratory Methods of the University of Glasgow was set up by resolution of the Faculty of Medicine to secure uniformity of the laboratory methods employed in clinical teaching at Glasgow. A fourth edition of *Notes on Clinical Laboratory Methods,* compiled under the auspices of that committee and approved by it for use in the teaching of clinical medicine in hospital wards, has now been published by John Smith and Son, 26–30, Gibson Street, Hillhead, Glasgow, at 2s. 3d.

The small practical book *Elementary Microtechnique,* by H. Alan Peacock, M.Sc., first published in 1934, has now appeared in a second edition. The author claims, not without justification, that his manual fills the gap between the scrappy instruction sheet and the large and expensive reference book on histological and cytological technique. It is published at 9s. by Edward Arnold and Co.

Preparations and Appliances

INSTRUMENT STERILIZATION

There have been frequent references in this *Journal* recently to methods of sterilizing instruments, in particular syringes and needles, and repeated warnings that spirit cannot be relied upon for this purpose. It should not be impossible to devise a solution which will achieve this and at the same time be non-corrosive to metal. These properties are claimed for "Kramsol," a new product of the Boots Pure Drug Co., Ltd. Its chief constituents are amyl-meta-cresol and formaldehyde, and experiments by the manufacturers have shown that bacterial spores of various species, whether suspended in a fluid medium or dried in serum on a metallic surface, are destroyed within four hours; non-sporing bacteria are naturally killed much more rapidly. Although neither metal nor the bristle of brushes is adversely affected, users are warned against sterilizing metal and rubber together by this method. The fluid is used undiluted and the price is 3s. per 20 oz. bottle.

DIPHENYLHYDANTOIN SODIUM

"Diphenylhydantoin sodium Crookes" is a preparation in tablet form of the valuable remedy for epilepsy produced by Merritt and Putnam in 1938. This compound seems to be notably superior to any previous anti-convulsant introduced because it produces its therapeutic action without exercising a hypnotic effect. It is made by the Crookes Laboratories in two forms of tablet, both containing 0.1 gramme. One is a divided tablet which allows precise control of dosage, and the other is a sugar-coated tablet which disintegrates readily when the sugar coating has been dissolved.

BRITISH MEDICAL JOURNAL
LONDON
SATURDAY OCTOBER 12 1940

REHABILITATION

A number of letters and other references have recently appeared in the *Times* with regard to rehabilitation after disablement. Dame Agnes Hunt, as president of the Central Council for the Care of Cripples, called attention to the number of Government Departments concerned with this matter and to the need, owing to greatly increased casualties of wartime, for co-ordinating action. Sir Farquhar Buzzard and Prof. Gask stressed the desirability of regionalizing any institutional arrangements to this end. Sir P. Varrier-Jones wrote on the subject of "light work," of the means of providing it (as at Papworth), and of the attitude of employers thereto. These and other aspects of the matter are becoming of increasingly urgent importance; and it is well that there should be a clear understanding of the nature of the broad problem, and a knowledge of the investigations and experiments that have already been made with a view to discovering the best solution.

It may be said, conveniently and correctly, that there are often three stages in the treatment of an injury (especially of a wound or injury involving a bone or joint). First comes the active surgical treatment with some period of rest or immobilization immediately after; then a stage in which massage and passive movement are the chief remedial features; lastly the stage of active exercise and graduated work. Not all injuries require treatment in all these stages, and not all patients, even with similar injuries, need them all. It is estimated roughly that, in peacetime, about 70% of patients so seriously injured as to require institutional treatment do not need skilled attention beyond that given in the first stage, with, in many cases, a very short second stage following. On the other hand, a small percentage of such patients are found to be disabled either totally and permanently, or at least to such an extent as to make future work impossible except under quite special conditions. In other cases the aim of modern surgery is to shorten the first two periods as much as possible and to pass as quickly as may be to the third. It is probable that war casualties will significantly modify the proportion of patients in these different categories in one direction or another. It is to the third stage only of treatment that the word "rehabilitation" should be applied—the stage, that is, between the period of essential immediate rest, or, where this is required, that of the completion of a course of physiotherapy under the supervision of the surgeon or surgical unit who dealt with the injury, and the point at which the stresses and strains of full or heavy work can be properly undertaken. The aim during this period of rehabilitation should be, to use the words of Dame Agnes Hunt, "to give to every disabled man or woman the chance of restoration to a useful life in the shortest possible time, or, failing that, the opportunity of using to the full the powers that remain to him for his own benefit and for the service of the country." This states the aim clearly and concisely.

Within the sphere indicated, and with such an object in view, the particular cause of physical injury from which some degree of disablement remains is clearly irrelevant. The medical and surgical problems are the same whether the patient is a member of His Majesty's Forces or a civil war-worker, or a private person injured by enemy action, or an industrial, agricultural, or domestic worker; and the psychological, economic, and social problems arising are essentially similar. The earlier treatment given may necessarily have been through or under the auspices of the Admiralty, the War Office, the Air Ministry, the Ministry of Health, or the Home Office; and the Ministry of Pensions, the Ministry of Labour, and the Board of Education may all be in some way interested or concerned; but the rehabilitation of disabled men and women is not a departmental matter the responsibility for which should be shared out in accordance with the nature of the origin of the disability; and, though enlarged by conditions of war, it is not dependent upon them. What is required, then, is something more than the mere co-ordination demanded by Dame Agnes Hunt and others, but a unified service permanently established in association with the hospitals of the country under the general guidance and help of the Ministry of Health.

The nature of the provision to be made for such a service, and the conditions under which treatment should be given, have been the subject of recent inquiry by more than one body of persons. The British Medical Association has itself made very important investigations in this field, and two of its documents embody valuable information and contain well-considered recommendations. These are the Report of the Special Committee on Fractures appointed by the Council, dated 1935, and the evidence of the Joint Committee of the Association and of the Trade Union Congress offered to the Interdepartmental Committee on the Rehabilitation of Persons injured by Accidents, towards the end of 1937. The essential conditions for the success of rehabilitation appear to be the segregation in institutions or centres exclusively devoted to this particular work; the formation of groups of patients (the optimum size is estimated at about fifty) under the personal charge of one medical superintendent; the continuity of this charge day by day and throughout each day; the proper provision for games, gymnastics, and workshops or vocational centres; and a sufficient contact with those who were responsible for the previous professional treatment of each patient. Several of these patient-groups could be accommodated in one remedial institution, and in every such institution the psychological (or psychotherapeutic), economic, social, and industrial needs—especially with a view to immediate employment on discharge—would have to be attended to by a suitable personnel. The first-named of these needs is of great importance, and a medical psychotherapeutist should be associated with each institution; but no pronounced or prolonged treatment of this kind should be pursued there, the quite small proportion of patients who have suffered profound mental disturbance with but minor physical disability

being transferred to hospitals or clinics of a suitable specialist character. The two B.M.A. documents referred to contain a good deal of information about existing rehabilitation centres, about the details of the establishment and working of proposed centres, and about the results and the really enormous economic and financial savings that can be secured thereby. No doubt some of these details would require modifications owing to war conditions and other circumstances; but enough material and experience is already available to show what should be done, and immediate and vigorous Governmental action should be forthcoming to do it, even in such times as we are now going through.

SAFE MILK IN WARTIME

On September 12 the Ministry of Information broadcast, in a News Bulletin, several items concerned with the preservation of the public health. It pointed out that the Government Health Services have, since the outbreak of war, given careful and constant consideration to the effects of such factors as troop movements and evacuation on the incidence of disease. In the years immediately preceding the war the Medical Research Council, acting on behalf of the Ministry of Health, had made plans for an Emergency Public Health Laboratory Service to increase the existing facilities for the rapid diagnosis and control of infectious disease, and this Service was mobilized at the outbreak of hostilities. More recently the Ministry of Health has arranged for an immediate extension of the system of water chlorination, so that small as well as large supplies shall be given this highly effective protection against contamination. These and certain other precautionary measures that have been taken are, it will be noted, of a kind that can be fully implemented by the action of the central or local health authorities. In regard to milk the case is different. As the Ministry of Information points out, great care is taken to secure the cleanliness of our milk supplies, but there can be no doubt that in times like the present special dangers of infection may exist. Maximum protection against these dangers can be obtained by boiling all milk that has not been pasteurized or sterilized. The milk should be brought to the boil and then cooled quickly.

This official acknowledgment that pasteurization, or sterilization, is the only method of providing safe milk for the population, and that, failing such treatment, the householder should protect himself, or herself, by boiling all milk before drinking it, will be welcomed by the medical profession in general, and in particular by this *Journal*, which has for many years pleaded for the compulsory pasteurization of all milk sold for drinking purposes. It is greatly to the credit of the Government that they should have publicly emphasized the importance of this precaution at the present time. It would have been still more satisfactory had it been possible to announce that all milk sold to the public would be pasteurized; but it is understandable that the dominant claims of distribution may make this impracticable. The result, it will be noted, has been to shift to the consumer the onus of securing his own safety, and still more that of his family. He has been warned; but the warning is frankly "*caveat emptor*." He must first ascertain whether the milk supplied to him has been sterilized or pasteurized. If it has not, he can try to shift his custom to a retailer who will supply him with safe milk. Failing this, he can render it safe himself at the cost of a little fuel and trouble.

How many of the public heard the broadcast, or read the report of it in the lay press, we do not know. But it would, we fear, be optimistic to hope that the good intentions of the Government will come to full fruition without further assistance. That assistance the family practitioner can give more effectively than anyone else. If he will call the attention of all his patients to the Government's pronouncement, and urge them to take the necessary steps to protect themselves against the very real dangers of milk-borne epidemics, he will be performing a service to the public health. He will find, among those who have given any thought to the matter at all, considerable misapprehension as to the nature of the risks involved. Tuberculosis derived from the cow is, perhaps, the most serious. It is certainly more serious than it was, now that large numbers of young children who were previously living in large urban areas, where almost all the milk was pasteurized, have been moved to rural areas where the retailer-producer holds sway and pasteurization is at a minimum. But tuberculosis is by no means the only disease to be feared, nor is the cow the only sinner as a spreader of infection. Milk is an admirable culture medium, and from the time it leaves the cow's udder until the time it enters the human mouth it is liable to contamination by a host of handlers unless constant and adequate precautions are taken in regard to treatment and storage. The many records of milk-borne epidemics of tonsillitis, of scarlet fever, of typhoid and other intestinal infections, and so on, have provided ample evidence of the passage of infection by the route from man to milk and back to man again. It is one of the few routes that can quite certainly be stopped at the cost of a little trouble. Why not stop it?

PEDICULOSIS IN EVACUATED CHILDREN

Some medical officers in reception areas are quoted in an "Occasional Bulletin" of the Health and Cleanliness Council as complaining of vermin infestation among the children received from evacuation areas. Wiltshire is taken as an example. The medical officer of health and school medical officer for Wiltshire, Dr. C. E. Tangye, states that the average number of school children belonging to his county who show any degree of vermin infestation is about 4%, as compared with 8% among the evacuated children. Wiltshire has been included in an investigation into pediculosis made by Mr. Kenneth Mellanby on behalf of the Board of Education and the Ministry of Health, and Mr. Mellanby substantiates the county figure of a 4% infestation and suggests that the complete elimination of pediculosis from schools is only prevented by re-infestation from younger children in the home who, of course, do not come under the regular cleanliness inspections of the school medical service.

The annual reports of the Chief Medical Officer of the Board of Education show a persistent 10% or so

of elementary school children who are still "found unclean" each year, although there have been great reductions in this respect in recent years, and, moreover, in most cases amongst these 10% who are infested the trouble is limited to one or two nits in the hair. Some areas and some schools are, of course, worse than others, and as the evacuated children from the large cities came to a considerable extent from the poorer and more overcrowded parts it is only to be expected that the incidence will be higher among them than the average figure for the locality. A point to be borne in mind is that the evacuation at the outbreak of the war took place at the end of the summer holidays, which meant that the children had not been inspected by the school nurse for four or more weeks, and owing to civil defence preparations at that time it was not found practicable to inspect the children before they left. It also seems possible that even the 10% or so of pediculosis is a cloaked figure, for it is derived from inspections notice of which has been sent to parents, so that the children come on the morning of inspection with their heads duly combed, and the official returns accordingly underestimate the real figure. The same thing is suggested by the fact that Mr. Mellanby has found that the incidence and degree of infestation of children admitted to fever and other hospitals are much higher than the figures for the school medical service of the area.

Foster-mothers in reception areas frequently cannot understand that many children in towns are habitually unable to escape harbouring one or two nits. A clear distinction, as one writer has pointed out, should be drawn between body lice and head lice. The incidence of body lice is a true measure of neglect and degradation, but the eradication of the head louse from girls is a much more difficult problem, even in these days of shorter hair, and indicates particular rather than general negligence, however reprehensible it may be. In any case there is real matter for congratulation in the greatly lessened incidence of uncleanness since the school medical service came into really effective operation. The proportion of London school children who could be described as clean was 88% in 1926, and now it is 97% or over. The figures of 8 or 10% infestation by pediculi, even allowing for a certain addition which might be discovered on a surprise inspection, must not be taken at their face value. The degree of infestation, which in a very large proportion of cases is slight, must also be taken into account.

THE PROBLEM OF THE SHELTERS

A front-rank public health problem has descended upon London. As was pointed out in an annotation on the subject in our last issue (p. 457), the air-raid shelters, originally designed as temporary refuges for people caught in the streets during a brief raid, have become, with the advent of all-night bombing, dormitories for hundreds of thousands of Londoners. Long queues form outside the large underground shelters in all sorts of weather, the people bringing with them rugs, pillows, and mattresses, in the expectation of spending in the shelter perhaps one-half of the hours of the twenty-four. The surface shelters, including those of the Anderson type, have stood up well to blast and splinters, but they no more than houses can withstand a direct hit, and the heap of ruins is there for everyone to see and discourages their use. People accordingly have sought deep shelters, especially the tubes, where, in addition to greater safety, they can enjoy relative quiet, social contact, lighting and warmth, and in most cases, though not in all, have the opportunity to lie down instead of being compelled to sit up. Some of these large shelters, which were never designed for any such purpose, have become exceedingly popular. The frowsy belongings which the people bring with them are left there during the day as a means of ensuring accommodation the following night. Old people, bedridden and infirm, are deposited by their friends quite early in the afternoon, and to some specially favoured shelters there is immigration from distant parts of London.

The crux of the problem from the hygienic point of view is overcrowding, to which must be added a wholly inadequate supply of sanitary arrangements. We hear of one immense shelter in which the only water-tap is situated close to the men's lavatory, which itself is of the most primitive kind. The cleansing of many of the shelters is defective, and medical supervision is often absent. The problem is intensified by the coming of the "catarrhal season" and by the possibility of an influenza epidemic; skin diseases have been reported among the shelterers. Various contagions may be expected in view of the fact that thousands of people never undress themselves night after night, and lie huddled in squalid proximity. The fear of epidemics led the Government to appoint the committee of inquiry of which Lord Horder is chairman, and this in a very short time made recommendations which are now before the Ministries of Health and Home Security. The recommendations are still confidential, but we believe that the committee has urged a vigorous pursuance of the policy of evacuation of children and of mothers with young children, as well as of the aged and infirm. The recent bombing has caused many people to change their minds on the subject of evacuation. The committee is also urging that the large popularly chosen shelters, assuming that they are reasonably secure or can be made so, should be duly recognized and scheduled, inspected regularly by the medical officer of health, properly equipped with sanitary arrangements, cleansed daily by a special squad of cleaners presumably under the borough engineer, and adequately ventilated, lighted, and warmed. The need for the conditioning of more deep shelters is urgent. If necessary, adjacent boroughs should pool their accommodation—this is no time to stand upon the ceremony of borough boundaries. Factory basements which at present are used only for the operatives during the day should be converted into places where these people can sleep at night, or, if not required for that purpose, should become ordinary public shelters. Some effort should be made to encourage people to use domestic and communal surface shelters. The great disadvantage of these is the noisiness and the feeling of insecurity, and it is not easy to persuade anyone needing sleep to go to a surface shelter if there is a chance of going underground. The vast crowds which nightly storm the tubes represent a psychological difficulty which it will take much persuasion to overcome. But some amenities might be provided in surface shelters which are at present lacking, and families might be encouraged to regard themselves as having a prescriptive right to certain portions of the shelter.

Lord Horder's committee attaches much importance to shelter marshals, who should be paid whole-time officials, chosen from the wardens service of the different

boroughs, and given a status entitling them to the recognition and help of the police and commanding authority among the shelterers. First-aid points should also be provided at every shelter accommodating more than a certain minimum of persons. The suggestion made in last week's issue that the local health organizations should form a panel of local medical men and women who would visit the shelters in order to ensure that some hygienic standard was maintained and to keep a look-out for any obvious cases of infection is on the agenda of Lord Horder's committee, which is actively continuing its work. It is also considering the possibility of supplying certain simple remedies which may be regarded as preventives, and is investigating the use of antiseptic sprays. The more simple the health measures taken the better. There is already an admirable health organization in the county of London for the medical inspection and care of school children; at present it is idle because the schools are largely closed. Could it not be directed to this problem, with a visiting doctor or experienced school nurse at every shelter which is used as a dormitory? Unless effective measures are promptly taken we can foresee with the approach of winter a state of affairs in respect of infectious and contagious diseases which may prove more devastating than the *Blitzkrieg*.

THE PREMATURE INFANT

A special conference on prematurity had been arranged in Germany for September, 1939, and although the meeting was cancelled the four opening papers have now been published.[1] Dr. A. Peiper, in a summary of his own work and that of others, dismisses as unimportant failure of the circulatory system because of "congenital debility," and states that he has not found any deficiency in the ferments or hormones present in premature infants. The nervous system, however, is in an unstable condition. This is shown particularly in the nervous control of respiration; certain primitive centres, such as a gasping centre and a centre concerned with periodic breathing of a Cheyne-Stokes type, are often found to dominate a weakly acting normal centre. Peiper also suggests that in immature infants there is a close association between the nervous control of sucking and that of respiration. This is seen in the rhythmical variations in both functions and in the fact that failure of respiration is often accompanied by failure of suction. Other evidence of immaturity in different systems is found in a tendency to capillary haemorrhage in various organs and to jaundice, and in dangerous falls in temperature indicating failure of the heat-regulating mechanism. Premature babies are especially susceptible to infection and more prone than normal infants to digestive disturbances, rickets, tetany, and anaemia. Prof. H. Krauer, discussing the amount of food required, states that most premature babies do well on a far smaller calorie intake than is generally advised. He claims that as little as forty calories per kilogramme body weight gives satisfactory results; in his cases the weight at three months of age was double what it was at birth. The allowance for a full-term baby is generally given as about 100 calories per kilogramme, so that Krauer's results justify him in suggesting that the whole question of metabolism of the small infant requires fresh investigation. Prof. A. v. Reuss, in a paper on home or institutional care, concludes that every premature baby who can suck at the breast or take expressed breast milk from a bottle and who requires no more attention than a full-time baby can be looked after at home. On the other hand, an infant who has difficulty in sucking or who has not yet learned the control of respiration and of temperature regulation needs the skilled attention of nurses in an institution. There are, however, certain desiderata for institutional care: (1) it must be possible for the mother to be admitted as well as the infant; (2) plenty of human milk must be available; (3) there should be sufficient trained nurses; and (4) great care must be taken to ensure that all air-borne or food-borne infection is excluded. Prof. W. Catel, discussing the feeding of premature infants, decides that unheated human milk is the food of choice. This may, however, present difficulties in the absence of a wet-nurse service at institutions.

[1] *Mschr. Kinderheilk.*, 1940, **81**, 321.

SCIENCE IN THE WAR EFFORT

To ensure continuance of the fullest co-operation of scientific workers with the Government in the national war effort the Lord President of the Council, after consultation with the Royal Society, has appointed a Scientific Advisory Committee, composed as follows: Lord Hankey (chairman); Sir William Bragg, President of the Royal Society; Dr. E. V. Appleton, F.R.S., secretary of the Department of Scientific and Industrial Research; Sir Edward Mellanby, F.R.S., secretary of the Medical Research Council; Sir Edwin Butler, F.R.S., secretary of the Agricultural Research Council; and Prof. A. V. Hill, F.R.S., and Prof. A. C. Egerton, F.R.S., respectively physical and biological secretary of the Royal Society. The Committee's terms of reference are to advise the Lord President on any scientific problem referred to it; to advise Government Departments when requested on the choice of individuals for particular lines of scientific inquiry or for membership of committees on which scientists are required; and to bring to the Lord President's notice promising new scientific or technical developments which may be of importance to the war effort. For such purposes as these the scientific members of the Advisory Committee are admirably equipped and their names command universal respect. Each member is accustomed to sifting new ideas and appraising both work and workers in the field of science.

RHYTHM IN RADIOTHERAPY

Biological phenomena of all kinds, whether considered in the individual or in the mass, exhibit rhythmical variations in activity, but in general the laws which must govern such rhythms, and by which therefore they could be predicted, elude discovery. Discontinuities in growth, whether normal or pathological, are a matter of daily observation, but the causes remain unknown, so that quantities of empirical data are unusable. Webster[1] made an attempt to show that the cancerous process exhibited periodic fluctuations in activity from which the probable times of recurrence or metastasization could be predicted, and Coutard[2] has tried to demonstrate that the effects of radiation on normal and neoplastic cells show a well-marked periodicity. Both observers have based schemes of radiotherapy on their observations, but the lack of any marked superiority of these techniques over others not based on any conceptions of periodicity shows that the observations are not capable of being generalized into laws. Holfelder[3] also has a scheme of treatment based on the recurring waves of erythema, but the times of his periods are wholly different from those of Coutard; a recent paper by Friedman and Rosh[4] supports neither.

[1] *Brit. J. Surg.*, 1938, **26**, 113.
[2] *Proc. Inst. Med.*, Chicago, 1935, **10**, 310.
[3] *Strahlentherapie*, 1933, **46**, 72.
[4] *Amer. J. Roentgen.*, 1939, **42**, 572.

Such contradictions are not in themselves important, since the technical factors, such as physical dose, daily dose, dosage rate, dose interval, and wave length, are not constant, all of which affect the biological response; but what is discouraging is that the application of the various theories does not show any real advance in results. The type of periodicity which Friedman and Rosh have observed during a course of radiotherapy is an alternation of the destructive process with the healing process. Using a fractionated technique, the cellulicidal effect of the radiation is greater during the first destructive phase than at any future time. The healing process is slow to start, but, in spite of the destructive effects of the continuing daily doses of radiation, gathers such momentum as to initiate a healing phase. Some weeks later the healing force is dissipated and the destructive force once again predominates. These observations recall that of Ewing[5]—that regeneration of the skin often occurs in spite of continued irradiation—but they do not disclose a law of periodicity. Ewing's explanation is that cells may acquire a resistance to irradiation by a process of adaptation, an explanation supported by Ferroux's[6] striking demonstration that the destructive effect of a given dose on the testis of the rat is much less when preceded by ten very small doses at monthly intervals. The conclusion may be drawn that the laws of periodicity must be looked for in simpler things before it can be hoped to find them in the complex processes resulting from the irradiation of tissues and body regions; as to cancer, the principle still holds that timidity in radiotherapy throws away the one chance of cure that there may have been.

TWO FORMS OF GENITAL INFECTION

It is generally recognized that infection with *Trichomonas vaginalis* is common in females, but in the past it has been regarded as rare in males. This latter view may require modification, as Liston and Lees[7] report an incidence of 4% of all cases (excluding syphilis) attending a venereal disease clinic, and 16% of all cases of non-gonococcal urethritis. These figures have not been confirmed by other workers, but perhaps others have not searched for this protozoon with sufficient care, or have not borne the possibility in mind. Non-gonococcal urethritis represents quite a large proportion of all cases of urethritis; the cause of many of these is obscure; often only *Staphylococcus albus* or a diphtheroid organism is found, and treatment by routine methods is frequently unsatisfactory. It behoves all V.D. medical officers, therefore, to think of trichomoniasis and to take appropriate steps to search for the organism; this may be done by hanging-drop or dark-ground examination of a fresh specimen or by staining with Leishman's stain. Seeing how common the infection is in women it would be strange if it were rare in men; when the organism is found in a patient an examination of the consort seems clearly indicated, particularly in the case of husband and wife. It should be remembered that, although the infection may be symptomless in males, it may cause serious trouble, particularly if the prostate is affected. To turn to another genital infection, leucorrhoea is so common that many women hardly look upon it as a disease, yet Liston and Cruikshank[8] found that in forty-nine out of 200 consecutive cases the condition was due to thrush (*Oidium albicans*). This organism when stained by Gram's method may be recognized by the appearance of septate pseudo-mycelium and blastospores. The importance of searching for this fungus in all cases of leucorrhoea of doubtful origin can hardly be overestimated, from the point of view of treatment and of the risks to the baby in a case of pregnancy. Epidemics among infants may be severe and show a high mortality, especially under institutional conditions, so that correct diagnosis and adequate prenatal treatment are matters of moment. It is of interest to note that aphthous vaginitis in adults receives scant notice in textbooks; yet if the above figures are accepted nearly one-quarter of all cases of leucorrhoea are due to a mould infection—perhaps this explains the chronicity of such a large proportion of these. Correct diagnosis is a prerequisite of correct treatment; if the possibility of these two infections is borne in mind it seems likely that many cases of genital infection of doubtful origin and resistant to treatment will clear up more rapidly in the future than they have done in the past.

[5] *Amer. J. Roentgen.*, 1938, **39**, 165.
[6] Radiophys. et radiothérapie. *Arch. Inst. Radium, Paris*, 1937, **3**, 281.
[7] *Brit. J. vener. Dis.*, 1940, **16**, 34.
[8] *Edin. med. J.*, 1940, **47**, 369.

WORK FOR THE WAR-BLINDED

The National Institute for the Blind in its annual report 1939–40 states that it has made a careful study of the possible problems of the war-blinded, and in conjunction with the Joint Blind Welfare Committee of the County Councils Association and the Association of Municipal Corporations has secured the approval of the Ministry of Health for a national scheme for extending existing facilities for blind welfare to men, women, and children who may be blinded as a result of air raids or hostile operations in this country. The Ministry had already arranged to meet the whole cost of hospital treatment in such cases. Any civilians who go to St. Dunstan's Hospital, Brighton, to be treated as military cases will receive some preliminary rehabilitation while under medical treatment there, but the main task of re-educating them and adapting them to new lives of usefulness will be undertaken by the Institute in conjunction with local societies and regional bodies and the responsible local authorities. This scheme will call for the establishment throughout the country of residential training centres. For the suitable staffing of such centres and the recruitment of helpers for the war-blinded when they return to their homes a register of war workers for the blind has been opened from which paid or voluntary workers may be drawn as required. The evening massage and electricity clinic connected with the Institute carried on uninterruptedly last winter and nearly 10,000 treatments were given. Qualified blind masseurs and masseuses were the first who volunteered for national service on the outbreak of war. The large majority enlisted in the Chartered Society's Massage Corps. The report goes on to give concise details of the Institute's work at its various homes and schools, which number seventeen and are located in various parts of the country. As recorded in last week's issue (p. 469) by the chairman, Sir Beachcroft Towse, Lord Nuffield has given £10,000 to help newly blinded people and their dependants.

The Ministry of Health has made the following appointments in the Emergency Medical Service: Assistant Consultant Adviser in Orthopaedic Surgery, Prof. Harry Platt, M.D., M.S., F.R.C.S.; Honorary Adviser in Rehabilitation, Mr. J. Rhaiadr Jones, manager of the Derwen Cripples Training College.

The Royal College of Physicians announces that the Harveian Oration, the Bradshaw, Fitzpatrick, and Lumleian Lectures for 1940 have been postponed.

AIR RAIDS: DEALING WITH CASUALTIES AT AN INCIDENT

BY

N. MORTIMER VALLELY, L.R.C.S.Ed.

The classification and efficient handling of casualties at an incident have always presented great problems. The existing arrangement whereby sorting and classification are made the responsibility of the leader of a stretcher party has always been felt to be unsatisfactory and far short of the ideal. Experience of actual raiding has in all cases shown the necessity for the examination and classification of casualties by a highly qualified officer *before* they are handled by stretcher parties. Moving casualties before they have been briefly examined by some qualified person and, if necessary, given some attention must inevitably result in many unnecessary deaths from shock, haemorrhage, etc. The ideal procedure would seem to be that a doctor should examine all casualties on the spot and give instructions how they are to be handled and dealt with. This presupposes a doctor or doctors being always available for the purpose, but only too frequently no doctor is at hand; and, further, it has been found in practice that it takes a doctor who is thoroughly well trained in this particular duty about three minutes per casualty in order to do what is necessary. Thus in the event of twenty casualties one hour would elapse before the last casualty was reached; and considerably longer would be taken unless the doctor had practised this particular work. This procedure would appear, then, in most cases to be impracticable.

A solution to these difficulties has been worked out, and has for a long time been practised at exercises in my district, and judging from such results would appear to be completely successful. It entails two new arrangements:

1. The provision of coloured labels with, preferably, pliable wire (not string), tabs, or safety-pins.

Red Label—printed on one side
HOSPITAL
See back of label for remarks

Blue Label—printed on one side
FIRST-AID POST
See back of label for remarks

Green Label—printed on one side
MOBILE UNIT
See back of label for remarks

White Label—printed on one side
C.S.C. { Home / Depot (First-aid point)
Walker { First-aid Post
See back of label for remarks

The three coloured labels are for stretcher cases, the white label for C.S.C. (car or sitting cases) or walking cases.

2. The special training of selected personnel called "Incident Doctors' Deputies" (I.D.D.s).

These would usually be selected from the present stretcher party leaders, and trained thoroughly in first aid and, so far as is possible, in the diagnosis and treatment of injuries. They should also be trained in the giving of morphine, and should eventually reach a considerably higher standard of specialized training than the usual leader. Until their places as stretcher party leaders can be filled they could combine the duties, but later they should be separate and supernumerary to the stretcher parties.

Procedure

The I.D.D.s each have a number and report into their depots individually. They are sent out by the report centre to an incident on bicycles or by car (a C.S.C. can be used) independently of the stretcher parties. If a doctor is present at the incident they will work under his general direction. Their duties will be to examine every casualty on the spot, and, having examined the casualty, to attach the appropriate label to him, after writing on the back any special instructions on treatment, morphine, etc.

If four I.D.D.s were sent out to an incident to twenty casualties the whole of their work would be completed in fifteen minutes, during which time the stretcher party would be following them up and so delay be avoided. The work of the stretcher party is immensely facilitated and well directed, as they are enabled to attend the coloured labels first and the white labels last, and are assisted by the directions on the back. Time is also saved because wardens (and others) can safely clear the site of all white label casualties after attention, taking these to the loading-point and leaving the stretcher-bearers to attend and transport the stretcher cases. The work at the loading-point is also simplified greatly, cases being sorted and dispatched readily by means of the label attached to each. A doctor, if present, can check the correctness of each label at the loading-point. The notes on the back of each label are available to the ambulance attendant during the ambulance journey. I.D.D.s, having completed their special duties, join with the stretcher parties in ordinary first-aid work, or, according to the number present, report back to their depots, whence they may be immediately dispatched by the report centre to another incident.

This scheme has not yet been tested under raiding conditions, and I would be glad to have the comments of those who are familiar with the local and remote control of casualty services during actual bombing.

Nova et Vetera

SIMON BARUCH (1840-1921)

Dr. Simon Baruch, an American pioneer in hydrotherapy and public health, was born on July 29, 1840, at Schwersenz, Prussia, but when he was still a child his family migrated to the United States. He received his medical education at Charleston and Virginia, where he qualified in 1862, and then joined the Confederate Army, serving under General Lee, and being twice captured while tending the wounded. From 1865 to 1881 Baruch practised in Camden, South Carolina, and then moved to New York, where he specialized in chronic diseases. In 1890 he reported on the value of municipal baths, recommending that they should be free to the public like parks. He was the first practitioner in the United States to urge the importance of natural remedies and to prescribe suitable diet, water, rest, and exercise, with a considerable restriction in drug treatment. The principal books he wrote were *The Uses of Water in Modern Medicine* (1892), *Successful Treatment of Typhoid Fever* (1893), and *The Principles and Practice of Hydrotherapy* (1898), and he was for some time editor of the *Dietetic and Hygienic Gazette*, the *Journal of Balneology*, and *Gaillard's Medical Journal*. Baruch was also the author of valuable papers on the surgery of appendicitis, and in 1888 diagnosed the first recorded case of perforative appendicitis to be operated on with success. He held several important appointments, including the chair of hydrotherapy at the College of Physicians and Surgeons, Columbia University, New York, and the presidency of the State Medical Association of South Carolina. In September, 1934, his name was given to a laboratory by the Saratoga Springs Commission in recognition of his work on cardiac therapy at Saratoga Springs.

MEDICAL FOLK-LORE

In her recent thesis (*Thèse de Paris*, 1940, No. 289) Dr. Yvonne Clancier has collected numerous examples of medical folk-lore illustrating the primitive mentality of the inhabitants of the Limousin, which consists of the three departments of Haute-Vienne, Creuse, and Corrèze. The thesis contains a brief description of the customs and beliefs which still prevail in Limousin relating to births, marriages, and funerals, festivals, ghosts, stones, trees, animals, etc., patron saints, and sorcerers. The inhabitants of the Limousin have a mystic conception of disease, which they regard as a demon or a magic force which has penetrated the body, so that a cure can only be effected by its expulsion and transfer to other persons, animals, or inanimate objects. Other examples of primitive outlook in the Limousin are the abundance of proverbs and their frequent use in conversation, as well as legends relating to were-wolves.

ECONOMY IN USE OF DRUGS

THE MEDICINE CUPBOARD IN WARTIME

Medical prescribers have hitherto enjoyed a welcome immunity from the privations of war. They owe this to careful accumulation of stocks of drugs in Great Britain before the outbreak of war, wise buying during the first year of the campaign, and the synthesis at home of vital remedies formerly secured by foreign patents. No thoughtful man can expect this immunity to continue now that the main onslaught of the enemy is directed against our shipping, our ports, and our industrial establishments. The northern seaboard of Europe is in the hands of the Nazis, and the transit of goods from the Mediterranean littoral and Asia Minor, which supply so many useful drugs, is precarious and delayed. Our financial resources must be conserved for the purchase of food and munitions. With these ideas in mind the Therapeutic Requirements Committee of the Medical Research Council has classified the drugs in common use in terms of their needfulness, as a guide to those concerned with the importation, manufacture, and distribution of drugs, and the preparation of formularies both for human and for veterinary use. The list is provisional, as the situation is changing so rapidly. It makes no pretension to completeness, and on this account it has not been published as a formal document; but it covers all the important galenicals.*

Classification into Categories

The drugs in the list are classified into three main groups as follows:

A. Drugs which are readily available at present or which are regarded as essential.

B. Drugs which are essential for certain purposes but the use of which should be restricted.

C. Drugs which are not essential and do not justify importation or manufacture in wartime.

Under Category B we may note that acetone, alcohol, glycerin, liquid paraffin, and paraffin wax are already subject to Government control as they are essential munitions of war. The same applies to drugs which are closely related to foodstuffs—dextrose, citric acid (usually manufactured from dextrose), syrups, honey, starch, malt and orange, fats, and endocrines. The remainder are more difficult to classify. Oil of chenopodium from the U.S.A., santonin from the U.S.S.R., and chrysarobin from Brazil may often be replaced by substitutes synthesized at home. The potassium carbonate from which most of the medicinal salts of potassium were prepared came from Germany; magnesium is essential for alloys for aircraft; many of the salts of these two metals can be replaced by the corresponding sodium salts. Ipecacuanha should be reserved for emetine for dysentery, cinchona for quinine for malaria, jaborandi for pilocarpine, styrax for friar's balsam, capsicum for capsicum wool, and agar for bacteriological media. Bismuth is essential for syphilis, but its use for gastro-intestinal disease could be greatly reduced. Boric acid and borax, iodine, and mercury have certain specific actions for which they are well-nigh indispensable, but it is fair comment to say that they are at present used extremely wastefully: few bacteriologists would be found to say a word in favour of fomentation with boric lint, daubing the skin with iodine, or perfunctory dipping of the hands in biniodide lotion. Finally it should be remembered that liquid paraffin, castor oil, and cascara ultimately represent hard-earned dollars, and the more these substances are used to lubricate colons the less is available to lubricate Spitfires.

A list of drugs whose importation is considered unnecessary is given in an appendix to this note; for all of them substitutes are available of a synthetic or galenical nature. A special word may nevertheless be said about gentian. Supplies of this useful plant came almost exclusively from the Pyrenees, the Jura and Vosges mountains, and the Black Forest, and when they are exhausted there seems little likelihood of their early replacement.

Some Hints to Prescribers

It would take too long now to comment on all the implications of these recommendations. The most effective way of bringing them into effect is the immediate preparation of wartime editions of the *National Formulary* and the hospital pharmacopoeias, and there is reason to believe that this will not be long delayed. There are certain steps, however, which the individual prescriber can take right away. The first is to have the courage to act on his knowledge that many illnesses can be relieved by simple hygienic and psychological measures and to eschew the prescription of placebos. The second is never to prescribe an alcoholic tincture or extract when a drug preparation or watery extract is available. The third is to keep a watchful eye on sugar, starch, and fats, with the knowledge that every ounce of these that goes into medicines comes out of the larder. In conclusion we may point out that there is no vegetable drug in the *Pharmacopoeia* which could not be produced in the Empire, and this fact is so important that we shall discuss it in a subsequent note.

List of Drugs the Importation of which is Unnecessary

Acid, tartaric	Jalap
Aconite	Krameria
Balsam of tolu	Linum
Buchu	Lobelia
Calumba	Ol. abietis
Cannabis indica	Ol. camph. essent.
Cantharis and Cantharidin	Ol. amygdalae
Carum	Ol. cardamomi
Cassia	Ol. carui
Catechu nigrum	Ol. crotonis
Coccus	Ol. gautheriae
Copaiba	Ol. santali
Coriander	Pelletierine tannate
Cubeb	Podophyllum (American)
Cumin	Psyllium
Cusso	Salicin
Ficus	Scammony
Foeniculum	Senega
Gelsemium	Strophanthus kombe
Haematoxylin	Tamarind
Hamamelis	Taraxacum

* Copies of the list have been supplied by the Secretary of the Medical Research Council to Government Departments and to the public bodies mainly concerned

J. Gourevitch (*Thèse de Paris*, 1940, No. 192), who records three illustrative cases in men aged from 25 to 33, states that intoxication by manganese, first described by Cowper of Glasgow in 1837, though rare, is likely to become more frequent owing to its use in war industry. When fully developed it is characterized by a pseudo-Parkinsonian syndrome presenting the following features: disturbance of gait, change of facial expression, affection of the voice and speech, tremors, subjective sensory troubles, and psychical disorders. The course of the disease is chronic, even if the patient is removed from the toxic environment. Some of the symptoms may gradually become attenuated and disappear, or on the other hand become worse. Individual prophylaxis consists in carefully washing the hands and cleaning the mouth after work and before meals. A special working dress should be worn as well as a mask. Collective prophylaxis is effected by removal of manganese dust and vapour in the workshops and periodical examination of the workers to detect early cases of the intoxication.

RED CROSS GIFTS FROM U.S.A.

As many readers are probably aware, an enormous amount of help has been given to the Red Cross and St. John War Organization by the American Red Cross, who have a Committee in London under the chairmanship of Mr. Daniel B. Grant, head of the Guaranty Trust Company of New York in London. The other members of the committee are the Ambassador, Mr. Joseph P. Kennedy, who is honorary chairman; Mr. Frederick B. Bate, vice-chairman; and Mr. Donald L. Gill, Mr. Hervey Cabell, Mr. Kenneth L. Lindsey, Mr. Wallace B. Phillips, Mr. Harry G. Seidel, and Mr. Lawrence L. Tweedie. This committee from time to time asks the British Red Cross point-blank what it wants most urgently, and in many cases can supply goods and material only obtained with great difficulty in Great Britain. Recently the Red Cross and St. John War Organization was asked for a list of pressing hospital necessities. The quantities intimated as really needed were supplied almost at once, together with a very valuable gift of surgical equipment, including many instruments both for general use and for special operations. The accompanying photographs illustrate three pieces of electrical apparatus: a mobile *x*-ray unit above, and mobile operating and dressing lamps below.

Gift from the
AMERICAN RED CROSS
to the WAR ORGANIZATION of the
BRITISH RED CROSS SOCIETY and
ORDER OF ST JOHN OF JERUSALEM

Fig. 1.—Mobile *x*-ray unit.

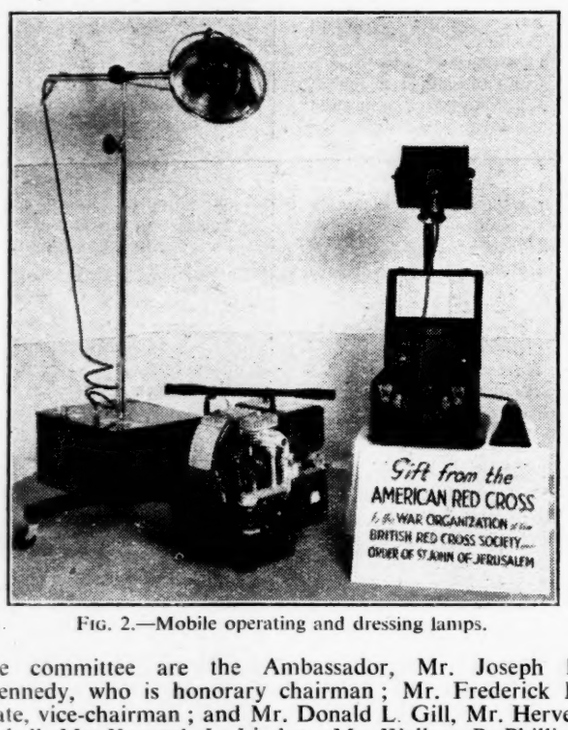
Gift from the
AMERICAN RED CROSS
to the WAR ORGANIZATION of the
BRITISH RED CROSS SOCIETY and
ORDER OF ST JOHN OF JERUSALEM

Fig. 2.—Mobile operating and dressing lamps.

ST. THOMAS'S MEDICAL SCHOOL

REOPENING IN SURREY

St. Thomas's Hospital, one of the most striking edifices of Victorian London, with its eight linked pavilions, and the medical school buildings separated from the hospital by a quadrangle, has been sadly damaged by air attack. Three direct hits on the hospital within six days made it obvious that the medical school could not carry on at Lambeth. The Arrangements Committee, by great enterprise and hard work and with the good will of county councils, other hospitals, and individuals, was able to make a good "home-from-home" in Surrey, at Godalming and Guildford, in time for the opening of the new session on October 1, the date originally fixed for the opening in the school buildings adjoining the hospital.

It is proposed to carry on teaching for the pre-medical and pre-clinical students in premises at Godalming which have been leased for a term of eighteen months. At one house, with thirty acres of land, about eighty students can be housed, and common-rooms and laboratories are available. At another, which is next door to the first, it is proposed to make a centre for anatomy, and some students may also be accommodated there. These houses have been fitted with the necessary laboratories and lecture-rooms. Laboratories at Charterhouse School, which is also at Godalming, have, by the courtesy of the Governors, been placed at the disposal of St. Thomas's for certain periods of the week, and here biology, physics, and chemistry will be taught. Physiology lectures and classes and pathology classes will be held at Manor House, and the gymnasium there will be used as a pathology museum and lecture room. Billets have been found for students and members of staff who cannot be accommodated at the two leased houses.

The clinical students, for whom in any case there are an inadequate number of patients at St. Thomas's, will resume work at Woking, Guildford, and other hospitals in Surrey. The first three months' clinical period will be carried out at the Southern Railway Orphanage, Woking; the second three months will consist of pathology at Manor House, Godalming, with clinical demonstrations at Guildford. Students acting as in-patient dressers and clerks will be posted to hospitals in Sector VIII, which is the St. Thomas's Sector, at Balham, Chertsey, Kingston, and elsewhere. It is also suggested that some of these students should be sent to the General Hospital, King George V Sanatorium. Students doing midwifery and gynaecology will be posted to Warren Road Hospital, Guildford, and other hospitals in the Sector where material is available, and final-year students will be sent to the Royal Surrey County Hospital, Guildford, where it is proposed to arrange for a surgical and medical tutor. Clinical demonstrations, revision classes, and lectures will be given by members of the staff of St. Thomas's at Guildford.

The secretary of the Medical School (Dr. R. J. C. Thompson) writes: "We do not intend to be pushed out entirely by Hitler or anyone else, and the Dean's office will still be at St. Thomas's, which will be the address of the medical school and the place of interview for parents and students. Except for perhaps two days a week, when I shall be going round the various places in Surrey, I shall be at St. Thomas's with most of my office staff." St. Thomas's, true to its traditions, which date from the twelfth century, thus shows a characteristic adaptability and resourcefulness in facing an unprecedented situation. From the gashes which have been made in the building it would seem that a very serious interruption in the work of the medical school must be inevitable; yet this has been avoided, and the work of the school has not suffered even one day's delay.

THE JOURNAL'S CENTENARY

MESSAGES OF CONGRATULATION

Since the publication last week of the Centennial Number of the British Medical Journal we have been gratified to receive further messages celebrating the occasion.

Sir Cuthbert Wallace, Bt., F.R.C.S., President of the London and Counties Medical Protection Society:

The London and Counties Medical Protection Society sends its congratulations and good wishes to you and all those associated with you on the production of the Centenary Number of the *British Medical Journal*. Never, surely, has any journal published its centenary number in such stirring though tragic times. Certainly no editor could have been faced with your difficulties. The mere presence of this special number is a tribute to you and previous editors who have so firmly established the *British Medical Journal* as a national medical institution. The Council of this Society has at all times been grateful to you and your predecessors for the publication of news as to the Society's activities and willingness in giving space to articles of interest to our members and to the medical profession generally.

Dr. W. N. Goldsmith, Editor of the "British Journal of Dermatology and Syphilis":

I offer you, on behalf of this journal, my warmest congratulations on the occasion of your centenary, and wish your excellent paper continued success in the future.

Mr. Bryan J. Wood, Editor of the "British Dental Journal":

May I offer you the congratulations of the *British Dental Journal* on the occasion of the centenary of the *B.M.J.*, together with my own regrets that the circumstances of the times make it impossible for so important an event to be celebrated appropriately. May I also add my congratulations on the manner in which you continue to overcome the present difficulties of producing the *Journal* regularly and punctually.

Mr. W. McAdam Eccles, M.S., F.R.C.S.:

At 8.15 a.m. to-day (Friday, October 4) there arrived by post my copy of the *British Medical Journal*. Smart work that! To be out to time would be good, but in the war conditions to continue to publish one day ahead of date of issue is surely a very great effort on the part of *everyone* concerned with the production, and also of the G.P.O. in delivery. I am sure every reader would desire to thank you and your staff for the "punctuality."

Sir John Weir, G.C.V.O.:

I have just opened my Centenary Number, and would like to add my congratulations to the many you have already received. You are worthily upholding the traditions of the past, and we are extremely grateful to you. Whoever wrote the leading article on page 455 is to be congratulated and thanked.

Miss J. Elise Gordon, Editor of the "Nursing Mirror":

I send, on behalf of the readers and staff of the *Nursing Mirror*, sincere congratulations and best wishes for your second century. Nurses generally, as well as we on this paper, have cause to appreciate the generosity and friendly co-operation of the medical profession. As for the *British Medical Journal* itself, we look forward with eagerness every Friday to seeing its familiar grey cover, certain that we shall find inside it many things to stimulate us to fresh ideas for our own readers.

Local News

ENGLAND AND WALES

The Tuberculous Recruit: New Regulations

To ensure so far as possible that medical boards are made aware of a recruit's previous history of tuberculosis new regulations have been issued by the Ministry of Health for the duration of the war to be known as the Public Health (Tuberculosis) Regulations, 1940. These require medical officers of health to supply the local offices of the Ministry of Labour and National Service with certain particulars of all males of ages to be specified from time to time who are registered as having suffered or as suffering from tuberculosis. The information is to be given on Form T.147, which is set out in the Schedule to the Regulations, and copies of which are being sent to all medical officers of health. Particulars are to be supplied at once of any males to whom these Regulations apply who were born in the years 1920 and 1921 or between the years 1900 and 1907 inclusive. The circular accompanying the Regulations states that the Ministry of Labour intends to ask every examinee before a medical board to sign a declaration that he has not at any time suffered from tuberculosis. Copies of the Regulations may be obtained from His Majesty's Stationery Office, price 1d.

Leeds Hospital Extensions

Extensions to St. James's Municipal General Hospital, Leeds, were opened last week by the Lord Mayor of Leeds, deputizing for the Minister of Health, who was kept in London by his official duties. The extensions, costing well over £140,000, comprise additions to the staff home, a new series of buildings including two operation theatres, x-ray and massage and electrotherapeutic departments, a nurses training school, a detached pathological unit, and additions to the admission block and nurses' quarters. They were described at the opening ceremony by Lord Harlech, Regional Commissioner for Civil Defence, as "one more milestone in the part which Leeds has played in the history of medicine and surgery." Lord Harlech proposed thanks to the Lord Mayor and to Alderman Sir George Martin, chairman of the Corporation Health Committee, who presided. Others to whom the thanks of the city were publicly offered were the architects, contractors, advisers, corporation departments, and the Ministry of Health; and Sir George Martin paid tribute to Dr. John Dick, medical superintendent of St. James's Hospital, for his help throughout the planning and building of the extensions, which will greatly improve the facilities provided by this large institution of 1,300 beds.

Yorkshire Blood Transfusion Service

The part which the University of Leeds is taking in the national war effort, particularly in aiding the blood transfusion service, was described by the Vice-Chancellor (Mr. B. Mouat Jones) in his address at a recent Congregation held in the Medical School, when degrees were conferred. The Vice-Chancellor said that the end of a year of war found the University Medical School flourishing academically, while vigorously maintaining a steady and practical war effort. After outlining the important duties undertaken by students and staff in civil defence, he spoke of the establishment by the Ministry of Health of a Regional Centre for blood transfusion. He recalled that recent discoveries had made it possible to store blood in the form of liquid or dried plasma for an indefinite period, whereas whole blood could be kept for a few weeks at the most. Plasma had many other advantages over whole blood, and its preparation was a task for a well-equipped laboratory staffed by skilled workers. Members of the University staff had been given leave to undertake that national service. The laboratory would provide plasma for all the hospitals and casualty clearing stations of the East and West Ridings of Yorkshire, as well as large stocks to meet the needs of the Fighting Forces at home and abroad. In the near future an appeal for new blood donors would be made.

Correspondence

R.M.B.F. Christmas Gifts Fund

Sir,—The war has brought many changes into our lives, but as winter approaches may I remind your readers who have so generously responded to my Christmas Appeal for many years not to forget or overlook the gifts which the Royal Medical Benevolent Fund endeavours to distribute to all its beneficiaries. These old people have had their share of hardships. For the most part they live alone in lodgings or in bed-sitting-rooms. Some have had to move out of their rooms by the coast, those in London and other towns have had anxious days and nights. I ask your readers to remember these medical colleagues, their widows and families, and to help us to send to each a gift of thirty shillings this Christmas as a token of our sympathy. The extra money brings comfort and warmth into many lonely, sad lives, and the feeling of "not being forgotten."

Donations should be sent to our new address, as under, and cheques made payable to "R.M.B.F. Christmas Gifts Fund." Please help, and forward donations now to enable the gifts to be distributed before Christmas Day.—I am, etc.,

Thos. Barlow,
President, Royal Medical Benevolent Fund.

1, Balliol House, Manorfields, Putney, S.W.15, Oct. 3.

Air Raids and the Tuberculous

Sir,—The recent intensive phase of night raids on our cities, and in particular on London, has given rise to many problems; but among these is one which is of importance not only from the patient's point of view but particularly from the public health aspect, since it affects control of the disease in the present and equally also in the future. I refer to the largely prevalent practice of tuberculous people leaving their homes nightly to seek refuge in public air-raid shelters, and of joining neighbours for "company" in adjacent Anderson shelters. Cases have been reported of patients (and patients themselves have told me) who are in the habit of doing both these things, and I actually know of one individual who had a haemoptysis during the night in a public shelter, and was prepared to return there the following night, but, fortunately, was persuaded not to do so.

Owing to local incidents due to explosive, fire, or delayed-action bombs, patients have had to be removed on mattresses to various shelters, to remain there until circumstances have permitted their return, either to their own dwellings or elsewhere. The crowded condition of shelters, especially in thickly populated districts, and the fact that infants and children are taken into them and therefore must come into close contact with many open and advanced cases of phthisis, suggest the possibility of considerable danger of infection of massive type. The approach of autumn and winter months, with their attendant epidemics of colds, influenzal catarrhs, and bronchitis, together with the difficulty of keeping shelters adequately warm and ventilated, is not going to help matters, especially when mental and physical stress and loss of sleep must tend to undermine vitality generally. The immediate consequence of all this on patients can already be seen in lowered resistance, loss of vitality and weight, and increase in symptoms; and I have seen that ill effects are definitely more noticeable in those who have not stayed at home but have sought a nightly refuge outside.

The future effects, from the public health standpoint, we can only surmise; but one cannot doubt that under these circumstances the campaign against tuberculosis must inevitably face a grave setback—all the more unfortunate in that it can to some extent be prevented. In my opinion the *immediate* necessity is to prevail on patients to "stay put" in their homes and not to make the nightly pilgrimage to the shelter, particularly those who come under the category of "bed cases." It is now only rarely that the patient in an advanced state will consent to go into a general hospital or away from home, and the invocation of compulsory powers is fraught with much difficulty and delay, and, I should imagine, has not even been tried. In one or two instances it has been possible to fix up voluntary removal of such cases to relatives in the country, who have been willing to accept responsibility and make suitable arrangements.

Individually, patients and their relatives have been talked to by the dispensary staff in this area, and the more or less remote danger of a direct hit on the dwelling pointed out as being less than the danger of acute activation and spread of disease by the continued stress of nightly "shelter life" in all weathers and under crowded conditions. In closely built areas the danger of injury from metal splinters to those who can remain on ground floors, away from windows, is slight, and the hanging of loose blanket screens across windows or between beds and windows can be advocated as a considerable check to glass splinters, even if blast or concussion in the vicinity does fracture the panes.

The constant inquiry on all sides as to whether any scheme is being contemplated for the evacuation of active and advanced tuberculous patients into rural areas (with or without their families), and the present difficulties in dealing with the tuberculous population (many of whom are ceasing to attend the dispensaries or have moved away leaving no address) would appear to indicate that the whole question should be actively considered by the Advisory Committee on Tuberculosis of the Ministry of Health in the light of future developments.—I am, etc.,

P. L. T. Bennett, M.R.C.S., T.D.D., D.P.H.,
Oct. 1. Tuberculosis Officer, Fulham.

Shock in Air-raid Casualty

Sir,—I have been confronted with the surgical problem described by Dr. J. McMichael and Mr. D. M. Douglas (September 28, p. 432), and I agree with their views that crushing injuries necessitate in many instances the most radical surgery in order to save the life of the victim. In a large number of cases life and limb could be saved in the following manner.

On admission the patient was given radiant heat and an injection of pituitrin; morphine was given only to those patients who were complaining of severe pain. The extent and severity of the damage to the soft tissues were carefully examined and the local circulation particularly noted; oscillometric readings were taken of the injured limb and compared with the corresponding uninjured limb. If it appeared that the general circulation to the limb and the peripheral vascular circulation were adequate to prevent a complete ischaemia, the limb was enclosed in a skin-tight plaster extending well above the level of the crushing and right down to the extremity of the limb—for example, for a crushed thigh the plaster should reach the lower part of the thorax. This was followed by a plasma transfusion. The blood pressure was watched, and in the majority of cases it remained high and the patient made a satisfactory recovery. The plaster was retained for ten to fourteen days; oedema but not shock sometimes followed its removal. In some cases a fibrous band developed in the area that had been subjected to the crushing.

In cases in which the limb has been compressed for many hours, as in the one described by Dr. McMichael and Mr. Douglas, there is less likelihood of the damaged tissues ever recovering. If the oscillometric reading is negative in the injured limb immediate amputation is called for. If the possibilities of survival of the tissues are doubtful it is better to treat the cases as described above, and if the blood pressure falls after the application of the plaster and the administration of plasma the limb should be amputated forthwith. In the most serious cases we employ systematically ether anaesthesia with the Ombredanne apparatus and local infiltration with novocain.

I have seen few cases of crushed tissues localized in a limb that, treated by the early application of a plaster, develop signs of circulatory damage in the toes, except in those in which no recovery ever took place after the crushing, and amputation had to be performed. On the other hand, a limb lying free may swell up very considerably, with resultant impairment of the peripheral circulation. The application of plaster to damaged limbs undoubtedly plays a part in averting the onset of shock by preventing the swelling of the tissues. It can be shown experimentally in animals that the application of plaster to limbs damaged by a tourniquet (which produces a great swelling once the limb is free) will prevent the appearance of the haemoconcentration that comes on a few hours after the release of the tourniquet.—I am, etc.,

Headington, Oxford, Oct. 1. J. Trueta.

Typhoid Fever and the Civil Population

Sir,—In your issue of September 28 (p. 432) I observed that Dr. O. Hilton was inquiring as to the inoculation of the civil population against typhoid fever. As your correspondent mentioned, the possibility of epidemics of the typhoid group of fevers has been for some time in the minds of many of us who have the responsibility of safeguarding the nation's health, and the recent circular of Sir Arthur MacNalty on this subject was welcome.

The need for such a scheme of inoculation depends largely on the possibility of any particular area suffering intense bombardment. It is highly unlikely that the whole country will be so affected. Southampton, however, was thought to be such an area, and the borough council was favourable to measures being taken, and clinics being started for the inoculation of the civil population. These clinics commenced last week in different parts of the town, and are held in the afternoons and evenings, and afford facilities for all who desire to have these protective injections. The general practitioners also have been asked to co-operate, and material is being issued to them to inoculate those who desire treatment from their own doctor. This issue is on the understanding that complete records are kept. The response so far has been most encouraging, and it is hoped that before the end of the year a considerable proportion of the inhabitants of the town will have been inoculated, thereby diminishing to a great extent one of the grave possibilities of aerial warfare.—I am, etc.,

H. C. Maurice Williams,
Medical Officer of Health for the County Borough and Port of Southampton.

Southampton, Oct. 1.

Débridement

Sir,—Mr. John T. Morrison's comment (September 28, p. 428) on the current use of this term would seem to be justified. Until recently my own impression had been that the vogue of this word in relation to wound treatment dated back to the last war. I was surprised to read in the translators' preface to *Surgery of the Hand* by Marc Iselin that:

"This term, i.e. débridement, was first used in connexion with the treatment of wounds by Desault (1789) and later by Larrey (1812), who popularized the procedure during the Napoleonic wars. It simply means enlargement of the wound in order to explore it and remove foreign bodies that are easily accessible, and/or to effect adequate drainage when the wound is already infected. Excision of wounds, including the removal of all foreign bodies and loose pieces of bone, has, on the other hand, only been made possible by the advent of anaesthesia, and was only used as a routine procedure during the later stages of the war (1914–18). Consequently, débridement and excision are not synonymous terms: in time alone there is a difference of a century between the two."

I find on referring to a French dictionary that the word "débridement" has a recognized surgical significance—namely, "relieving constriction by incision." In the fourth edition of *Emergency Surgery* by Hamilton Bailey the following statement is made (p. 642):

"Débridement (Wound Excision).—Débridement is a word which has become common in the American literature, and is to be found in the more recent British articles on the subject. As long as we understand by the term a meticulous technique—something more than a general cleaning and freshening of the wound edges—etymological values need not detain us here."

The present confusion of these two words in surgical terminology may indicate more than lack of verbal clarity. It might, for instance, be agreed that débridement (in the strict sense of the word) would be commendable technique in a wound of the hand, whereas excision of such a wound might not be so confidently advocated. In the treatment of war wounds the late Prof. Rutherford Morison (though he did not use the term) might be said to have practised débridement rather than excision. Conceivably, therefore, more is involved than mere logomachy.—I am, etc.,

William Mackenzie.

Newcastle-upon-Tyne, Sept. 30.

Sir,—Mr. J. T. Morrison's letter on the use of the term "débridement" is a timely one. This word is now used so loosely in surgical papers as to have little exact meaning, and it is used to cover the relief of tension by incision, or the removal of foreign bodies or dead tissue, or even the complete surgical excision of a wound. And at the same time each writer tries to use it in the light of his interpretation of its meaning. I do not want to enter here into a discussion of the question of "primary wound incision" as based on the experimental work of Friedreich or into the clinical applications of this by Lemaitre and others in the 1914–18 war. But it is certain that the two conditions for the success of primary suture are the suitability of the wound and the supervision of the patient by the operating surgeon till the wound is healed. The exponents of primary suture are agreed that the method has no place in a war of movement or under conditions which may render early evacuation of the patient likely.

In the recent German medical war literature the terms "surgical revision" or "wound revision" have been introduced. These terms seemed to me to be so appropriate to what the surgeon actually has to do in the majority of cases of war wounds that in the recently published first number of the *Bulletin of War Medicine* I have used these terms, and added the following explanation:

"The term 'surgical revision' is one which has recently been introduced, and includes the following: (1) examination of a serious wound under anaesthesia; (2) determination of its extent; (3) removal of dead tissue and foreign bodies; (4) arrest of haemorrhage; (5) provision of drainage if required. It will be seen that 'revision' includes considerably more than the French term 'débridement.'"

Most important surgical wounds require "revision" in the sense of this definition, and some may be suitable for primary suture. But the word "débridement" has lost its original meaning, and to most medical students it conveys nothing more than the removal of debris.—I am, etc.,

Reginald T. Payne, M.S., M.D., F.R.C.S.

London, W.1, Oct. 1.

A Distinctive Colour for Chloroform

Sir,—Chloroform is still widely and indiscriminately used as a general anaesthetic by inexperienced anaesthetists. Recently I operated on a case of acute appendicitis. By mistake chloroform had been poured into the drop-bottle labelled "Ether," and was being administered as ether on an ether mask. Fortunately the error was recognized in time and no harm was done. This is not a unique experience. Such mistakes have happened before, sometimes with tragic consequences, and will be repeated so long as the differentiation between chloroform and ether depends on a label on a bottle and an imperfect sense of smell. In order to avoid the possibility of such regrettable accidents I suggest that it should be made compulsory to give chloroform a distinctive colour by the addition of some harmless colouring agent, preferably before it leaves the manufacturers' hands. Red (for "danger") would be an appropriate colour.—I am, etc.,

F. R. Brown.

Dundee, Oct. 2.

Nurse Anaesthetists

Sir,—I have followed the correspondence in your *Journal* on the subject of nurse anaesthetists with some interest, and venture with diffidence to submit to your readers the observations of one who is neither an anaesthetist nor a surgeon.

Surely the anaesthetist branch is only one of many branches of the medical profession, each of which demands of its members postgraduate study in a recognized school. Neither newly qualified medical men nor nurses with six months' experience of administering anaesthetics conform to this standard, and it is only a question of time before the long-suffering public will demand that the man or woman who anaesthetizes them is as well qualified to do so as the surgeon who operates on them, and that the anaesthetist and the surgeon are working in an atmosphere of mutual confidence.

The future of medical treatment in this country does not depend on the action of this or that hospital in regard to its responsibilities; it does depend on the capacity of each part

or region of the country to provide every member of its community with skilled service in time of illness or accident, whether that service is in the field of anaesthesia, of medicine, of pathology, of surgery, of radiology, or of obstetrics. Such an ideal can only be attained in the case of anaesthesia when three conditions have been satisfied: (*a*) the specialty has been recognized as one requiring postgraduate study; (*b*) there are schools where such study can be pursued under expert supervision; and (*c*) anaesthetist services have been organized in such a way that every member of the community can have as much confidence in his anaesthetist as he has in his surgeon—and, may I add, each surgeon has as much confidence in his anaesthetist as in himself!

Lord Nuffield established the first University Chair and department of anaesthetics in this country in the hope that this branch of medicine would soon receive its legitimate share of public and professional recognition. The department over which Professor Macintosh presides will continue to give admirable postgraduate training to qualified practitioners who desire to specialize in anaesthesia, but other departments of the same kind are necessary to meet the demands of the country as a whole. In Lord Nuffield's Provincial Hospitals Trust there is the seed of a regional organization under which the public may be assured of competent anaesthetization and the anaesthetist of the recognition as well as of the wage he deserves.—I am, etc.,

Oxford, Sept. 30. E. FARQUHAR BUZZARD.

SIR,—Dr. John Elam's little satiric letter (September 14, p. 368) prompts an obvious correction. Cambridge needs no defence, but to contrast her unfavourably with Oxford in this matter is to show oneself lamentably ignorant of the facts. Oxford is so lucky as to have a wealthy benefactor, part of whose magnificent donation is earmarked for anaesthetics. Cambridge, in the absence of similar help, has to concentrate on the practical proposition of providing good anaesthetists for the patients at Addenbrooke's.—I am, etc.,

Isleworth, Middlesex, Oct. 1. J. BLOMFIELD.

SIR,—Dr. John Elam should have known better than to use satire in a letter to a serious professional journal. Had he forgotten the fate of Samuel Butler at the hands of the Christians?

The sequel has been sad. Shades of the mandragora-root have been conjured from Cornish caves as dubious allies in his cause; while his true friends turn to rend him in fierce righteousness. What could be expected when one did not know which side he was playing for?

The curious arguments put forward by the staff at Addenbrooke's Hospital (September 28, p. 429) merit the attention of the General Medical Council. It will be agreed readily that a nurse with six months' training in the administration of anaesthetics may be more experienced in that subject than a newly qualified medical practitioner whose education has been neglected. Unfortunately the same can be made to apply to any branch of medicine.

When Cambridge again leads the way by the recognition of nurse psychologists, nurse ophthalmologists, nurse paediatricians, etc.—under qualified supervision, of course—the tedious formalities at present devoted to these subjects in the medical curriculum will have become superfluous.—I am, etc.,

London, N.W.9, Sept. 28. A. T. RODEN.

SIR,—The art of the anaesthetist consists in the choice of the most suitable agent and the best method of its administration in each individual case, thus ensuring the greatest facilities for the surgeon's operation and the maximum degree of safety for the patient during and after operation. It seems difficult to understand how this ideal can be attained unless the anaesthetist has the medical training enabling him to examine the patient before operation, and to have some appreciation of the nature of the surgical condition calling for intervention—also of any medical complications present likely to be aggravated by the efforts of the surgeon or anaesthetist. The assessment of operation risks is the duty of the anaesthetist as well as the surgeon.

The employment of nurse anaesthetists may be a wartime necessity, but should never be a peacetime institution.—I am, etc.,

London, N.W.2, Oct. 3. RAYMOND E. APPERLY.

Tuberculosis of the Knee-joint in Adults

SIR,—I have read with great interest Dr. L. A. Key's article (September 28, p. 408), with its careful analysis of the cases of tuberculosis of the knee-joint treated at St. Luke's Hospital, Lowestoft. His findings on a large scale correspond to those in my smaller material in the Dorset and Somerset C.C. Hospitals, and they justify the policy now adopted by most British orthopaedic surgeons—that is, to attempt to induce permanent and relatively early healing by open operation in the form of an arthrodesis, which aims at bony union between femur and tibia. What is not easy to decide is the exact moment when the patient will best stand the disturbance of an operation. Theoretically one should wait until quiescence of the local lesion has been obtained and a good state of general health, but there are no absolute tests of either of these factors, while, as Dr. Key points out, a certain number of patients fail to show much improvement in nutrition, or colour, or sedimentation rate under the best conservative treatment.

It is for such cases that I would recommend a simple procedure which in my hands has produced bony ankylosis and healing in patients whose lung complications made the tuberculosis officers condemn them as unsuitable for general anaesthesia, or in whom the presence of multiple sinuses made it undesirable to open tissues widely.

The operation was described before the Section of Orthopaedics of the Royal Society of Medicine in December, 1939 (*Proc. roy. Soc. Med.*, 1940, **33**, 149), but seems not widely known yet. It consists in making drill-holes in the bones of the knee-joint. This is done through a small skin puncture over the inner condyle of the tibia, passing first an awl and then a very narrow gouge across the joint interval in as many directions as is convenient, rotating the instrument so as to chew up small sections of bone. The principle is to release osteoblasts into the articular cartilage and synovia at a number of points, so that ossification may occur in the joint, as it does in the late stages of osteo-arthritis but so seldom does spontaneously in tuberculosis. Usually the operation is done with the limb lying in a plaster shell, prepared some time previously, so as to disturb the limb as little as possible during and after operation. If a small degree of deformity is present, this can be corrected about three weeks later, when soft callus has bridged the bones, and a close-fitting plaster can be applied for walking, provided no signs of active tuberculosis remain. If bony union should fail to occur one still has the possibility of carrying out the classical erasion operation; but one has tested the patient's liability to "flare-up" on a small scale, and usually his general health improves markedly after this simple operation, while local pain subsides.—I am, etc.,

Bath, Sept. 30. M. FORRESTER-BROWN, M.S., M.D.

SIR,—In regard to the operative treatment of this condition described in Dr. L. A. Key's instructive paper (September 28, p. 408), I think that the operation of excision and arthrodesis of the knee for tuberculosis requires considerable attention to detail if success is to be assured. The operation of arthrodesis of the knee-joint need not be difficult when it is performed for a condition such as osteo-arthritis or injury, because in these cases the removal of the articular surfaces can be done without dividing the collateral or cruciate ligaments. Coaptation of the ends of the bone presents no difficulty, therefore, in these cases. In excision and arthrodesis of the knee-joint for tuberculosis, however, the restraining ligaments are divided, the bone-ends are sawn across, and it is not a matter of ease and certainty to obtain coaptation, in my opinion, unless precise methods are employed to do so.

A horse-shoe-shaped incision is used which begins over the most prominent part of one condyle of the femur and sweeps distally and then across the lower part of the infrapatellar tendon, curving upwards again to reach the prominence of the opposite femoral condyle. The incision is deepened to divide the quadriceps expansions and infrapatellar tendon. The joint is opened freely, the flap retracted upwards, and the knee flexed, exposing the whole of the anterior compartment of the knee. The collateral ligaments and cruciate ligaments are divided. The suprapatellar pouch, all the diseased synovial membrane and diseased tissue are removed, including the menisci. The tibia is drawn forwards by an assistant and its articular

extremity sawn across parallel to the plane of the joint, removing about a quarter of an inch of bone. A narrow spatula is placed posteriorly to protect the structures at the back of the joint while the cut is being made. An additional safeguard is provided by completing the final part of the division by using the saw as a lever. The femur is now sawn across parallel to the plane of the joint, and not at right angles to the shaft of the bone. This is a part of the operation in which great care must be exercised, to avoid subsequent genu varum, genu valgum, genu recurvatum, or too much flexion. If the first saw-cut of the femur is wrong it is quite likely that a second attempt may be unsuccessful and thus needless sacrifice of bone made. It is well to practise this cut on an anatomical specimen. About a quarter of an inch of the bone is removed, and the aim is to obtain accurate fitment of the bones in the extended position of the limb. Areas of bone disease exposed by the cuts are curetted and the cartilage of the patella removed. Free access is now obtainable to the back of the joint, and it is at this stage that careful removal of the synovial membrane is effected there, the bursal connexions being followed up and curetted. The bursae may be overlooked. Pressure by a hand at the back of the knee empties them of caseous material, and thus their entrances are made visible.

The tibia and femur are now apposed by the surgeon himself, and the assistant inserts two excision pins driven obliquely into the femur through the two tuberosities of the tibia. This part of the operation is not easy to accomplish with certainty. It is of considerable assistance to apply a shaped sterilized aluminium splint, previously prepared, to the back of the limb, extending from the middle of the thigh to the middle of the calf. It is covered with sterile gauze. The splint is applied to the limb, the tibia and femur reduced upon it, and the surgeon grasps the splint and limb above and below the knee while the pins are being driven into position. All this can be done under direct vision, and it is important that the driving of the pins should not open up a gap between the ends of the bones. The heads of the nails are not driven closely up to the skin; about half an inch of the pins is left projecting and treated with bipp. The surgeon never moves his hands in his grasp of the limb and splint during these stages, nor until the finished retentive appliance has been put on. The assistant closes the wound by interrupted catgut stitches for the infrapatellar tendon and quadriceps expansions. The skin is closed by interrupted silkworm-gut sutures, and no drain is required. If sterile gauze is used as a roller bandage it must be applied by its own weight. If the turns are pulled upon to try and produce a compression effect the venous circulation is interfered with and the patient suffers considerable pain. Sterile cotton-wool is applied from the toes to the lower chest and retained with broad sterile domette bandages. These may be applied with moderately firm compression round the limb. A plaster-of-Paris casing is applied from the toes to the chest. It is advisable, therefore, to operate with the patient on a fracture table. The splint may be included if the surgeon so decides, but if one is confident as to the position and fixation it may be removed after the pins have been driven in. Post-operative *x*-ray photographs are taken in two planes through the completed plaster to see that proper coaptation has been obtained. As a rule, in an operation conducted along these lines, this is found to be satisfactory, but, if not, correction is possible by "wedging" the plaster at the knee. In three or four weeks small windows are cut to remove the pins. They slide out quite easily. Otherwise the main dressing need not be interfered with until it is time to remove the plaster casing, and this is done in about four months according to the evidence of bony union seen in *x*-ray films of the joint. I do this operation without a tourniquet. Cases of failure of union in excision and arthrodesis of the knee-joint for tuberculosis that have come under my notice have been associated with post-operative fixation that did not include the hip. I have met with cases which have been failures from, presumably, imperfect removal of the disease.

The operation may have to be done before the epiphyses have united, but there is no interference with their growth because the ends of the bone are sawn across near the joint. I have seen cases in this category which have exhibited flexion deformity subsequently at the lower femoral epiphysis. It might be advisable, therefore, in young subjects to protect the limb, after removal of the plaster spica, by a walking calliper. The half-inch of shortening which usually follows excision and arthrodesis of the knee need not be compensated for by raising the shoe, because in the extended position of the limb this amount of shortening allows the foot to clear the ground in walking.—I am, etc.,

Edinburgh, Oct. 4. W. A. COCHRANE.

Small Sterile Dressing Containers

SIR,—Attention was drawn by Major Bruce Dick, R.A.M.C. (December 30, 1939, p. 1294), to the unnecessary wastage caused by the opening of large sterile dressing drums for the dressing of relatively small injuries. This has also proved true in my experience in Station sick quarters.

Major Dick's method of overcoming this was to take cigarette canisters, pierce a dozen fine holes in the lid, pack therein dressings, autoclave in the usual way, then seal by dipping in paraffin wax. This method is open to three objections: (1) the difficulty of obtaining and melting paraffin wax; (2) the soiling of the autoclave during the subsequent sterilization of the tins, due to the melting paraffin wax; (3) the accidental breakage of the wax seal during the subsequent handling.

The following experiment was therefore initiated: Two "Flat 50" and one "200" cigarette tins were obtained and both lid and floor were perforated in six places with a one-eighth-inch twist drill. The tins were packed with gauze dressings of various sizes. Cellophane envelopes to contain each tin and leave a liberal overlap were obtained. The tins and envelopes were autoclaved separately. On completion the tins were enclosed in the envelopes, and each packet held firm by four rubber bands. The packets were then kept in the pathological laboratory, Cheltenham General Hospital, under conditions closely approximating those in S.S.Q., and were opened at intervals of fourteen days, twenty-eight days, and forty-two days, with the results as shown in the following report:

Dressings were autoclaved on May 9, 1940, at 150 lb. pressure per square inch for half an hour. On May 23 cultures were made anaerobically and aerobically, and an organism which resembled the *B. subtilis* group was then recovered from the anaerobic culture; this was thought to be due to laboratory contamination. The aerobic culture remained sterile up to seven days' incubation, when it was discarded. On June 6 aerobic and anaerobic cultures were made; these remained sterile up to seven days' incubation. On June 20 aerobic and anaerobic cultures were made, these remaining sterile up to seven days' incubation.

This completed the bacteriological examinations of the three tins of dressings submitted. It is suggested that this method could with advantage be introduced for all S.S.Q. and out-patient departments as an adjunct to the present large sterile drums. I am indebted to Dr. T. B. H. Haslett, Cheltenham, for the bacteriological investigation.—I am, etc.,

E. B. RAYNER,
Oct. 2. Flight Lieutenant, R.A.F.M.S.(V.R.).

Cause of Appendicitis

SIR,—Dr. J. Price Williams (September 14, p. 367) has raised anew the many problems connected with appendicitis. Inflammation in the appendix area is nearly always brought about by the contents of the alimentary canal. It is difficult to get any inflammation unless some septic organism is available. Septic organisms are probably always present in considerable numbers in the human body, and only await a suitable stimulus to set them into activity.

When flesh foods are present in the alimentary canal and for any reason are retained there owing to insufficient peristaltic action, then there is a focus ready for the multiplication of micro-organisms in the decomposing proteins at this point of stasis. Carnivorous animals, through the aeons of evolution, have got over the difficulty by very considerably shortening the alimentary canal. The human animal retains the greater length of intestine, which makes constipation accompanying the flesh meal a ready source for the multiplication of organisms of a pathogenic character. The caecum and the attached appendix provide a ready receptacle for the

constipation to result in a corner being filled with this infected matter so that the passing bowel contents cannot push it on to the anus but leave the matter in this corner undisturbed. Hence the multiplication of micro-organisms results in inflammation of the appendix.

My experience has been that appendix inflammation in an otherwise healthy body may be looked upon as a temporary process, which will subside in the same way as all other inflammations subside when the cause can be removed. By giving a patient an enema, followed by a week's fast; giving nothing whatever by mouth beyond sips of water, fruit juice, and vegetable tisane in quantities of not more than half a pint a day, together with castor oil and olive oil in equal parts, a dessertspoonful three times a day; and enjoining rest, I have so far not had a case that has needed operation, though I do not thereby imply that an operation is never needed. My point rather is that if one knows the cause one can prevent it, and in many cases can cure the trouble by removing the cause—that is, change from the diet of the short-intestine carnivore to the diet of the frugivore. If an anatomical frugivore wishes to indulge occasionally or regularly in the dietary of the carnivore he must be prepared to suffer the ailments to which the special carnivorous intestine is immune, or else he should apply to a surgeon to have his gut so shortened that he possesses a safe but an artificially produced carnivorous intestine. I have always admired the logical decision of the great surgeon who has now retired—namely, that to keep pace with modern dietaries every man should have a resection of his descending colon.—I am, etc.,

London, W.1, Sept. 21. Josiah Oldfield.

Insulin in Phthisis

Sir,—Dr. George Day's article on this subject (September 21, p. 376) was especially interesting to me because I, too, have been using insulin for a small series of my patients suffering from this disease as I have encountered them in my practice.

Under the conditions of general practice it is difficult to persuade patients to have more than one injection a day, and I did not get any good result until I started using zinc-protamine-insulin. I give as large a dose as the patient can stand, injected at my morning surgery or during the morning round; an average dose is 40 units, though some can take 60. After three or four days patients feel better and are eager to continue. Increased appetite is felt always for the next two meals, and often for supper as well. Under these conditions gain in weight is from one-half to one pound weekly.—I am, etc.,

Bath, Sept. 30. Charles Hagenbach, M.B.

Foetal Circulation in Right Atrium

Sir,—In your issue of October 5 (p. 470) you published a letter from Prof. J. D. Boyd about the separation of the two blood streams in the foetal right atrium. As one of those who have had the pleasure of co-operating with Sir Joseph Barcroft in direct *x*-ray cinematographic studies of the foetal circulation, I should like to amplify, and to some extent to amend, Prof. Boyd's statement.

The whole of the superior caval flow passes into the right atrium and thence into the right ventricle. The bulk of the inferior caval flow goes from the inferior vena cava via the foramen ovale into the left atrium, and thence into the left ventricle. A small portion of it, however, passes into the right atrium and right ventricle.

The division of the inferior caval stream occurs just outside, and not inside, the right atrium, for the foramen ovale is not, as currently stated by anatomists, within the right atrium but at the termination of the inferior vena cava. We ourselves, in the paper[1] quoted by Prof. Boyd, followed the usual anatomical description, for we had at that time no reason to doubt its accuracy. Subsequently, however, we have studied in some detail the history of our subject, and in two later papers[2,3] we have, so to speak, put the foramen ovale in its proper place.

The historical survey,[4] when it is published, will show that William Harvey never wrote, as he is stated to have done,[5] of a mixing of the superior and inferior caval blood streams within the right atrium, and that Richard Lower (1669) and a few subsequent writers correctly placed the foramen ovale outside the right atrium proper. In other words, to pass from the right to the left atrium through the foramen the blood would first have to go back into the inferior vena cava.

Our radiographic studies of the physiology have been confined to the sheep; our anatomical studies have had a much wider range.—I am, etc.,

Oxford, Oct. 6. K. J. Franklin.

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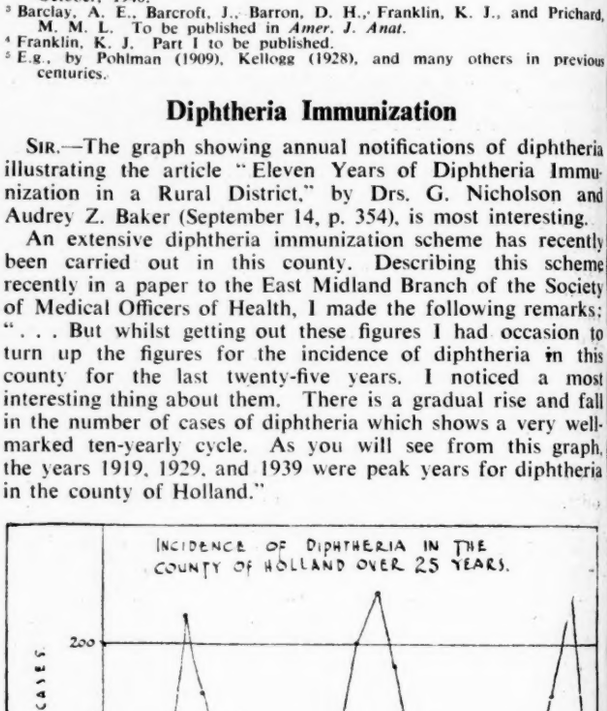
4 Franklin, K. J. Part I to be published.
5 E.g., by Pohlman (1909), Kellogg (1928), and many others in previous centuries.

Diphtheria Immunization

Sir,—The graph showing annual notifications of diphtheria illustrating the article "Eleven Years of Diphtheria Immunization in a Rural District," by Drs. G. Nicholson and Audrey Z. Baker (September 14, p. 354), is most interesting.

An extensive diphtheria immunization scheme has recently been carried out in this county. Describing this scheme recently in a paper to the East Midland Branch of the Society of Medical Officers of Health, I made the following remarks: ". . . But whilst getting out these figures I had occasion to turn up the figures for the incidence of diphtheria in this county for the last twenty-five years. I noticed a most interesting thing about them. There is a gradual rise and fall in the number of cases of diphtheria which shows a very well-marked ten-yearly cycle. As you will see from this graph, the years 1919, 1929, and 1939 were peak years for diphtheria in the county of Holland."



I do not think it is generally recognized that diphtheria shows this cyclic incidence. I do not remember ever having been taught so. The length of the cycle appears to vary from district to district also. In the article referred to the cycle in New York City is given as six to seven years, the Tiverton figures show an eight-yearly cycle, whilst ours give a ten-yearly cycle.

As will be seen from the graph I enclose we got the 1939 peak which Tiverton avoided; our scheme, which was an intensive one, having been started towards the end of 1939. It is obvious from Nicholson and Baker's graph that their immunization scheme has upset the periodicity of diphtheria in their area. We are looking forward with interest to see if the same thing happens here.—I am, etc.,

A. C. Gee, M.R.C.S., D.P.H.,
Boston, Lincs, Sept. 19. Assistant County Medical Officer.

Rescue Work after Air Raids

Sir,—Concern for the fate of people buried in the wreckage of bombed houses impels me to inquire through your columns whether every possible effort is being made to effect their rescue. My own experiences and those of a number of people to whom I have spoken raise grave doubt in my mind on this question.

Recently when called to give morphine injections to people trapped in the debris of their home nothing was being done

to extricate those still living. On inquiry I was told nothing could be done till morning. On another occasion I was told three days after the collapse of the house that it was not known whether a lady, a patient of mine, was in the cellar or not. Here again no activity seemed to be in progress.

I am informed that the trouble is a lack of proper equipment and of adequately trained rescue squads. If this indictment should indeed be true I trust the B.M.A. will insist upon the immediate reformation of this most important service.—I am, etc.,

London, N.W., Oct. 6. W. A. M. SWAN.

Our Unused Influence

SIR,—While millions of men and women are devoting their utmost courage and energy to human destruction, those whose activities are normally oppositely directed are reduced to dumb acceptance of events.

Neither before, during, nor after the war of 1914–18 did the doctors, teachers, and lawyers who might have helped a sick and disillusioned world make any attempt at organized effort to avert recurrence of that demoralizing and wasteful tragedy. Narrowness of outlook has been responsible for an omission which so surrendered the future to soldiers, politicians, and their half-castes. Death and misery came to millions, not only by wounds but by typhus, influenza, starvation, tuberculosis, dysentery, and malaria. Our work was greatly concerned, but we had no word to say against it all. Faith has been sickeningly destroyed, and a dull animal acceptance of life has taken the place of more bracing emotions in many human hearts.

Can we do no better? Is there not a greater aspect to our work than that of disease through the microscope? Are obstetricians to be indifferent to the major question of population? Are surgeons to devote careful thought to the individual wounded but remain careless to the repeated mass infliction of wounds?

Education and organization have lessened infectious disease and proved good servants to tropical medicine. Organization and education can alone prevent the wounds of war, and as surely as that is true is it within the right and proper place of doctors, all the world over, to unite in protest against war and to do what they can to bring about better human understanding through their international liaison. Generosity and forethought are requisite to lasting peace. There can be no hope in the over-emphasis of nationalism which the world to-day acclaims. The time will come when the nations will have opportunity to make their choice again between security based on force and a co-operation which must be generous.

I submit, sir, that we should, as doctors, seek to find a larger part to play in maintaining the structure of peace, and that we should not again watch the assembling of the forces of death and disease and starvation as if it were no concern of ours. War is a denial of what the profession of medicine stands for in all countries. Our own is but one of the influences which might be mobilized against it.—I am, etc.,

East London, S. Africa, Aug. 27. GEORGE H. ALABASTER, M.D., F.R.C.S.Ed.

The Mobile Unit in Action

SIR,—May I make use of your columns to ask for the personal experience of any medical officers of mobile units who have so far been called into action? In this small town in a very rural area the personnel attached to the unit take it in turn to man the unit every time the "Alert" is sounded and to sleep at the depot at night in anticipation of it. (We are rarely disappointed.) But is this eventually going to be useful, judging by others' experience? Certain criticisms can be made against the organization, the main one being that operative intervention should never be undertaken without thorough treatment for shock, for which mobile unit equipment cannot be adequate. However, if in the last few weeks mobile units elsewhere have actually been used with success, it is obviously essential to maintain them. Otherwise the personnel might usefully be absorbed into the fixed aid posts and ambulance teams.—I am, etc.,

Great Dunmow, Sept. 30. G. O. BARBER.

Obituary

F. G. THOMSON, M.D., F.R.C.P.

Consulting Physician, Royal United Hospital, Bath

It must have been with a great sense of shock and grief that the many friends and patients of Dr. F. G. Thomson of Bath heard of his sudden death. If it had to be, none could have wished the manner of his death to have been otherwise, for it was almost instantaneous and in the midst of his work. Since the beginning of the war he had returned to the active staff of the Royal United Hospital to work in the out-patient department, and on the morning of his death he had interrupted his work there for a few minutes to watch an air battle, a spectacle which he enjoyed with his usual gusto and trenchant comment.

Thomson had many medical associations, his father having engaged in general practice at Luton for many years. His brother Campbell, who predeceased him, was known to the whole profession as a member of the staff of the Middlesex Hospital, while his cousin StClair is world-famous. Frederick George Thomson was educated at Epsom College, at Sidney Sussex College, Cambridge, and at the Middlesex Hospital, and his brilliant career, during which he gained many scholarships and prizes, gave promise of the high standard of excellence which he later showed as a physician. He won a gold medal for his London M.D. in 1907, and was elected to the Fellowship of the Royal College of Physicians in 1926. After holding various offices at the Middlesex Hospital he went to Portugal as medical officer to the British Hospital, Oporto, and returned to partnership with the late Dr. Douglas Carr in Bath in 1906. The latter's death soon after this left him to build up his own position, which he did with conspicuous ability and success. He had a large general practice, which, however, he gave up after a long illness in 1925 in favour of consulting work devoted chiefly to cardiology and rheumatic diseases. He also took a great interest in chest conditions, and introduced the method of closed drainage in empyema into his own hospital with such success that no operation for rib resection is recorded for ten years. A recent contribution on penetrating wounds of the chest was received by the readers of the *British Medical Journal* with great interest. He served in France and Mesopotamia during the last war, and subsequently was on the staff of the Ministry of Pensions Hospital, Bath. After the war he was elected to the physicianship of the Royal United and the Royal Mineral Water Hospitals, Bath, and subsequently became consulting physician to both these institutions and to several cottage hospitals in the surrounding districts. He was elected a trustee of the Royal United Hospital, Bath, three years ago, in recognition of his great interest in hospital management and progress.

For the British Medical Association he did much useful work. When Forbes Fraser, the President-Elect, died six months before the Bath Meeting of 1925 Thomson was elected to fill his place, but ill fortune seemed to dog the office, for Thomson became ill and could not fulfil his functions at the meeting itself, and his Presidential Address

was read by his second son, Malcolm, who had recently graduated at Cambridge, though not in medicine. The acknowledged success of the Bath Meeting, however, owed much to Thomson's efforts and influence, and from that time he became one of the recognized leaders of the profession in the West of England, and had been President of the Bath, Bristol, and Somerset Branch and twice Chairman of the Bath Division, and of course a Vice-President of the Association. He served on the special Committee on Arthritis set up by the Council and was on the executive committee of the Spa Practitioners Group. He was President of the Section of Physical Medicine of the Royal Society of Medicine for 1931–2, and was elected a consulting physician to the British Red Cross Clinic for Rheumatism, Peto Place, London. His contributions to medical literature have not been voluminous, but are marked by deep learning and shrewd common sense. He was part author of two books on rheumatism and contributed several articles to medical periodicals.

His chief characteristic was a sterling common sense, and a wit if sometimes mordant never unkind. He did not suffer fools gladly, and rogues earned his contempt. The infinitely better standing of the spa physician at the present day compared to that enjoyed even a few decades ago owes much to Thomson's efforts and example, and his influence in checking the extravagances of his younger colleagues has been most salutary. His recreations were mostly in the direction of field sports, and he spent his holidays fishing, acquiring that mellow personality which seems to characterize the devotees of that art. His colleagues and a wide circle of friends and patients mourn the loss of a great gentleman, a distinguished physician, and a sincere friend.

Sir StClair Thomson writes:

Frederick George Thomson's father (my uncle) came from Ardrishaig, Argyllshire (like myself), and took his M.D. at Glasgow, where he was Lister's dresser. He settled in practice in Luton, where he had three sons and two daughters. The youngest son settled in the Argentine: the eldest was the late Dr. H. Campbell Thomson of Middlesex Hospital; and Dr. "F. G." was the second. After Cambridge he studied at Middlesex, where he had such a distinguished career that he might have looked forward to joining the staff. But he was never attracted by London life and he wanted to marry, so accepted the post of British physician at Oporto, where he made many lifelong friends at the "Factory House." After a few years there he settled in Bath, where he became one of the leading consulting physicians in the neighbourhood. He received a rude bludgeoning of chance when, after presiding over the preparations which made the Annual Meeting in Bath such a success in 1925, he was stricken with pleurisy and his Presidential Address had to be read by his son. He was a good shot and much in request in the country round. But his chief interest in sport was fly-fishing, and for many years he used to join his father salmon fishing in Scotland. He married a lady whose charm all visitors to the Bath Meeting must have appreciated. He leaves three sons, who were all educated at Oundle and Sidney Sussex, Cambridge. The eldest was the champion public school boxer and the Cambridge blue for boxing. He settled in the Argentine, but has returned to this country lately and is now in the Black Watch. His second son, after a business career on the Continent, is now working in one of our embassies, where his financial training and knowledge of languages are appreciated. His third son is in business at Newcastle-on-Tyne.

The following well-known medical men have died: Dr. Frederick Gault-Finley, emeritus professor of medicine and at one time dean of McGill University Faculty of Medicine, Montreal, aged 78; Dr. Joseph William Schereschewsky, medical director, United States Public Health Service, aged 67; Dr. Carlos G. Malbran, professor of bacteriology in the Buenos Aires medical faculty; and Dr. Austen Fox Riggs, clinical professor of neurology at Columbia University, New York, aged 64.

CARSTAIRS CUMMING DOUGLAS, M.D., D.Sc.

We regret to record the death, as the result of a street accident on September 28, of Dr. Carstairs Cumming Douglas, professor of medical jurisprudence and public health, Anderson College of Medicine, Glasgow.

Professor Douglas was born at Kirkcaldy, Fifeshire, in October, 1866, and was educated at George Watson's College and Edinburgh University. He also studied for some time in Berlin. After eight years of public school life he entered the medical classes of his university, and qualified in 1890, taking the M.B., C.M. with first-class honours. In 1896 he took the M.D. of Edinburgh with honours, and in 1906 the D.Sc. (Public Health) of the same university. His student career was exceptionally brilliant. Among the prizes which fell to him were the Wilson Memorial Prize, the Sibbald Scholarship, the John Aitken Carlyle Bursary, the Buchanan Scholarship, the Ettles Prize, and the Lecky-MacTier Fellowship.

In 1899 he was elected professor of medical jurisprudence at Anderson College, a post he continued to hold until the end of his life, and from 1903 onwards he conducted the public health laboratories there. For eight years he was pathologist to the Royal Maternity Hospital, Glasgow, and for many years he acted as bacteriologist for the counties of Argyll and Stirling. In 1907 he was appointed examiner in medical jurisprudence and public health to the University of Aberdeen; he held a similar position in respect of the Scottish Conjoint Board, and for six years he was examiner in public health to the National University of Ireland. In 1910 he was appointed lecturer in hygiene to the Glasgow provincial committee for the training of teachers, and for a number of years he was director of the West of Scotland Clinical Research Laboratory. But his main life-work centred at Anderson College, where for a time he was dean. He was a member of the British Medical Association, joining it shortly after his qualification.

A frequent contributor to medical journals, he was also the author of two textbooks: *Chemical and Microscopical Aids to Clinical Diagnosis*, published in 1899, and *The Laws of Health: A Manual of School Hygiene*, published in 1907. As a lecturer he was noted for his careful preparation and for his accomplished speech, which, together with his engaging personality, his genial disposition, and his patience as a teacher, made him extremely popular with generations of students. He was one of the most cheerful men one could meet in a day's journey, and his passing will be widely mourned in Scotland. The fatal accident took place at the gates of the college which he had served so well for more than forty years. He is survived by his widow and by a son and a daughter.

With the passing of Dr. Patrick Joseph Haydn Mulholland Northern Ireland has lost an outstanding personality. Born in Ennis, Co. Clare, he spent his student days in Foyle College, Londonderry, graduating later in the old Royal University of Ireland as Bachelor of Music, and in medicine at the Royal College of Physicians, Edinburgh. Throughout his life music and medicine claimed equal shares in his affection. As a young man he was organist in St. Peter's Church, Belfast, while he was building up a very extensive practice in medicine. Later he was organist in St. Patrick's Pro Cathedral, Belfast, and head of the ophthalmological department of the Mater Infirmorum Hospital. In his pursuit of knowledge in the field of ophthalmology he spent some time in Vienna and in Egypt. To the poor of Belfast Dr. Haydn Mulholland was a benefactor in so many ways that his name is a household word among them, and the respect and affection in which they held him are a tribute to long years of unwearying service on their behalf. By his medical colleagues he has ever been highly respected and beloved. His integrity and outspoken defence of the right, when occasion demanded, were in accordance with his high ideals of medical etiquette and the dignity of the profession. He was ever ready to risk his popularity rather than allow a wrong to go unchallenged. As an impromptu speaker he was hard to surpass; he was never at a loss for an apt phrase or even for a compliment turned with all the charm of bygone

days and ways. As a member of the board of management of the Mater Infirmorum Hospital his cool critical judgment was most valuable. Only a few weeks before he died he was asked to allow his name to go forward as candidate for the presidency of the Irish Ophthalmological Society. Those who knew him intimately were privileged to share in a very staunch friendship. His sympathies were deep and his loyalties unswerving. To his widow and daughter our hearts go out in deep sympathy in their sad bereavement.

E. M. H.

In the obituary notice of Dr. NATHAN RAW published on September 14 reference was made to his cultures of tubercle bacilli, and we surmised that they might still be in existence. Dr. Raw's son now writes to say that a full set is in the care of the National Type Cultures, and up to six months before his death Dr. Raw personally carried out the monthly subculturing of the bacilli. This latter set of cultures is still in the care of his laboratory and will be carried on. A point not mentioned in the memoir was his work with *x* rays at Dundee soon after Roentgen's discovery had been announced. Though he gave up active work on *x* rays early in this century his hands were badly affected.

Included in the tragic list of those who lost their lives when the S.S. *City of Benares* was torpedoed and sunk without warning in the North Atlantic on September 16 are the names of seventy-nine of the ninety-two children who, it was thought, were being carried to safety in America and of the medical officer in charge of these children, Dr. BETTY MARGARET ZEAL. Dr. Zeal, who was the youngest daughter of the late G. H. Zeal of Headley Down, Hants, was educated at St. John's School, Bexhill, Bedford College, and University College Hospital. She graduated M.B., B.S. of the University of London in 1934, and took the M.R.C.S., L.R.C.P. in the same year, and the D.P.M. of the London Colleges in 1938. She was employed at the Hammersmith Hospital before she undertook the medical care of these child evacuees to America, an undertaking which revealed her life's ambition to devote herself and her energies to the health and welfare of children. Dr. Zeal, who was 30 years of age, joined the British Medical Association in 1936.

Dr. JOSEPH MATSON of Ballykelly, Co. Londonderry, who died at his home on September 19 at the age of 69, was the chairman of the Londonderry Division of the British Medical Association, a position which he had occupied with great distinction for the past twelve years. Dr. Matson had an engaging personality: everybody liked him, and he liked everybody. During the years of his presidency many and varied were the changes that took place in medical practice in Northern Ireland, and the Londonderry Division was fortunate to have his wise and tactful counsel at their disposal. Nothing was too much trouble to him, and he seemed to enjoy the endless committee meetings that were practically an everyday event when the National Health Insurance legislation was being put into effect. No set of circumstances ever arose which his ability was not capable of surmounting; his unfailing tact, good humour, and shrewd common sense were unconquerable. As is so often the case with men of his type, he had a great fund of anecdotes and enjoyed recounting them; no social function was ever complete without a story or two from Dr. Matson. He was the dispensary medical officer of the district in which he lived for the past twenty-seven years, where he also had a large and successful private practice. His many patients in every walk of life will miss him.

Mr. ARTHUR PERCY DODDS PARKER, who died in retirement on September 22, was for many years a well known and greatly respected surgeon in Oxford, where he had been a medical student before entering the Middlesex Hospital. He graduated M.A., M.B., B.Ch. in 1896 and took the F.R.C.S. in 1902, after serving as house-physician at the Middlesex Hospital and house-surgeon at the Radcliffe Infirmary, to which he was afterwards appointed assistant surgeon and later full surgeon. He served with the Imperial Yeomanry Hospital in the South African War, and during the last war he was lieutenant-colonel R.A.M.C.(T.), in charge of the surgical division of the 3rd Southern General Hospital at Oxford, and assistant consulting surgeon to the Southern Command. In the academic work of the University Mr. Dodds Parker had taken part as examiner in anatomy and surgery, demonstrator of anatomy, lecturer in applied anatomy, and Litchfield lecturer in surgery. Outside his surgical practice and teaching, which centred in the Radcliffe Infirmary, he was a familiar figure among Oxford oarsmen as an old rowing blue who coached a long succession of college crews.

Dr. JAMES A. WALLS died at Bothwell, Lanarkshire, on September 23 after a prolonged illness borne with exemplary patience. Born at Inverkeithing in the kingdom of Fife, and educated at the village school and at Dunfermline High School, he took up pharmacy in 1903, and acquired the chemist's business in Bothwell. His heart was, however, in medicine, and he graduated M.B., Ch.B. at Glasgow University in 1918. Next year he purchased a share in the one-time largest practice in Lanarkshire, and this he very successfully conducted until struck down by illness. He took his full share in all the village activities of Bothwell—the bowling green, the library, and especially the Bothwell Brig Commemoration Services; likewise he also took his full share in all the medical activities of the county, and especially did yeoman service for the Panel Committee, of which for some years he had acted as secretary. With his expert knowledge of pharmacy he was invaluable at the Drug Accounts Subcommittee. Dr. Walls was for several years a member of the executive committee of the Lanarkshire Division of the B.M.A. He was predeceased by his wife some years ago; there was no family. A large and representative gathering at his funeral signified his place in the affection of the people.

Dr. WILLIAM RANKIN died, after a brief illness, on September 24 at his home, Ballyhaskey, Newtowncunningham, in his eightieth year. He died in harness, having scouted any idea of retirement, and had just completed his fifty-fifth year of practice in the same district without taking a single day off for illness. He had been a member of the British Medical Association for fifty years. Dr. Rankin was in many ways a remarkable man. In addition to being a first-rate doctor, covering a very large part of Co. Donegal, he was extremely interested in agriculture, took a leading part in the improvement of livestock in this district, and was an extensive and successful breeder of pedigree cattle and sheep. He always maintained that he owed a very large measure of his success in this direction to his medical knowledge. Another facet of his many-sided character was his oratorical skill. He was a deeply read man, and any paper or address which he gave, either to medical or to lay audiences, was something of an event. Dr. Rankin was educated at Foyle College, Londonderry, and took his medical qualifications at Glasgow University in 1884. He was for a time house-surgeon in the Londonderry City and County Hospital. He then went to sea for a few years before settling down in his native district to build up a very successful and extensive practice. He is survived by his widow, one son—Dr. G. D. Rankin, who is serving with H.M. Forces—and three daughters. Among nine brothers and sisters also surviving him are Dr. John Rankin of Southport and Mr. D. S. Rankin, a dental surgeon practising in Belfast.

Dr. LEONARD ERNEST ACOMB, who died recently at Newport, Mon., had been a member of the British Medical Association for the past thirty-two years. He qualified M.R.C.S., L.R.C.P. in 1906 from the Middlesex Hospital and afterwards took the D.P.H. of Oxford. While in general practice at Newport he was keenly interested in surgery, of which he did much during many years on the honorary staff of the Royal Gwent Hospital. Only this year he retired before his time from the post of senior surgeon. Dr. Acomb took his hospital duties seriously and gave much time and assiduity to them, doing capable work in those branches where his interests particularly lay. A colleague writes: He was a very kind man, though gruff, with a high sense of his responsibility to his patients. They will miss him. With this went an honesty and straightness in his dealings with others. He spoke much of those who had been his contemporaries at the Middlesex and of their subsequent successes, and he valued their friendship. Lately he had had indifferent health and bore much pain with his characteristic courage. He had interests outside medicine in hunting, fishing, and other out-of-door activities. He was a past president of the Newport Medical Society and had acted as M.O.H. for Newport; and had contributed several papers to the medical journals.

Medico-Legal

USE OF THE TITLE "DOCTOR"

Two summonses heard by the Bournemouth magistrates last August raised the interesting question whether a practitioner who is a doctor of medicine but not registered in this country may call himself "doctor." In 1931 the General Medical Council ordered the registrar to erase from the *Medical Register* the name of Anthony Alexander Martin. Mr. Martin was at that time registered as possessing the English Conjoint qualification and the degrees of doctor of medicine and bachelor of surgery of London University. The two Royal Colleges withdrew their diplomas, but the university did not withdraw its degrees, and had in law no power to do so. The Medical Defence Union took out the two summonses complaining that by calling himself "Dr. Martin" and using the letters M.D. the defendant had infringed the Medical Act, 1858. Counsel for the Union said that in October, 1939, there had appeared in the *Bournemouth Daily Echo* an advertisement for the Institute of Glandular Treatment, Majestic Chambers, Westover Road, Bournemouth. Mr. Martin was employed by that institute at a salary and a weekly commission and was described as a medical supervisor employed to make diagnosis. In the circumstances, the Union said, he was masquerading as a medical practitioner. Counsel produced two documents, one to the matron of a nursing home in Glasgow asking her to give a patient injections and beginning "I, Dr. Martin"; and the other a receipt signed "A. Martin, M.D." A detective-sergeant said that Mr. Martin had told him that he was an M.D. and B.S. of London University and an M.R.C.S. and L.R.C.P., and that he had come off the *Register* in 1931. Another witness said that she had been examined by Mr. Martin at the institute and had paid him a fee. Mr. Martin, in a statement to the Bench, maintained that he had never said or implied that he was on the *Register*, and that he was entitled to use his degree of M.D. and to practise; he had never misled the public; the Medical Defence Union were always trying to "get at" the institute, and he had been put up as a target. The Union relied chiefly on the decision of the Divisional Court in Jutson *v.* Barrow.[1] In that case the practitioner had called himself a manipulative surgeon, and the Lord Chief Justice said that Sect. 40 of the Medical Act was twofold: it first prohibited the use of a number of commonly used titles, and then prohibited the use of any description implying that the holder was registered or recognized by law. The Act, he said, does not describe the intent of the user of a title but only the effect of the use. Its object is to prevent a person not on the *Medical Register* from using a title suggesting that he is on the *Register*. The magistrates agreed with this view of the law, and fined the defendant £5 on each of the two charges with £16 11s. costs.

[1] *British Medical Journal*, 1935, **2**, 879.

Universities and Colleges

UNIVERSITY OF LEEDS

To express the debt that he owed to his mother the late Lord Moynihan endowed a lectureship at the University of Leeds in her memory. The first Moynihan Memorial Lecture was given in the Riley-Smith Hall of the University on October 3, the seventy-fifth anniversary of the birth of the great surgeon. The lecturer, Surgeon Rear-Admiral Gordon Gordon-Taylor, senior surgeon to the Middlesex Hospital, chose for his subject "The Moynihan Tradition."

ROYAL COLLEGE OF SURGEONS OF ENGLAND

Museum Demonstrations

A course of museum demonstrations in the theatre of the College begins to-day (Friday, October 11), when Mr. C. E. Shattock will discuss tumours of bone. He will speak again on tumours of the kidney on October 14. On October 18 and 25 and November 1 Dr. A. J. E. Cave will discuss anatomical specimens, and on October 28 Mr. R. Davies-Colley will demonstrate specimens illustrating inflammation of bone. All the demonstrations begin at 3 p.m., and are open to advanced students and medical practitioners.

Medical Notes in Parliament

When the House of Commons met on October 8 Mr. Churchill surveyed the course of the war for the previous month. He said the improved methods of shelter adopted in the great built-up areas had reduced the air-raid casualties below the estimates which had been made. When Great Britain entered the war hospital arrangements had been on the basis of 250,000 casualties merely as a first provision, whereas from the beginning up to October 5 there had been, as the result of air bombing, about 8,500 killed and 13,000 wounded. Since heavy raiding began on September 7 the figures of killed and seriously wounded had declined from over 6,000 in the first week to under 3,000 in the last of the four weeks. Destruction of property had, however, been very considerable. They must try in the shortest possible time to have shelters with sleeping bunks for everyone in the areas liable to constant attack. Nation-wide compulsory insurance would be introduced by Sir Kingsley Wood against damage by the enemy to house, place of business, household effects, and personal possessions. Mr. Eden would soon announce improvements in the allowances for the dependants of the Fighting Services to secure proper nourishment and care of the wives and children of the fighting men.

Air-raid Shelters and Public Health

Captain Elliston asked on October 8 if it was intended to appoint to the committee now investigating public health considerations in reference to air-raid shelters one or more municipal officials. Mr. Herbert Morrison replied that a committee had been appointed, under the chairmanship of Lord Horder, to keep these matters under review. The committee consulted a number of local government officials in the course of their first inquiries and would continue to do so.

On the same date Mr. Sorensen inquired what steps had been taken to secure effective ventilators, disinfection, heating, and other amenities in public air-raid shelters. Mr. Morrison said vigorous action had been and would continue to be taken to secure that every practicable improvement was made without delay; Admiral Sir Edward Evans, one of the Regional Commissioners for London, had been charged with the special duty of expediting and co-ordinating action in this matter within the London Region.

Sir Robert Young asked whether Mr. Morrison knew of the insanitary conditions of air-raid shelters in many country districts and the risks to health and physical strength owing to the absence of some method of seating whereby expectant mothers and mothers with young children had to stand for hours during an air raid. Mr. Morrison answered that he had asked local authorities to take urgent action to improve the amenities in shelters.

Mr. Churchill announced that the House would on October 9 debate air-raid problems.

The Services

NAVAL AWARDS

Surgeon Commander Alexander William Gunn, M.V.O., R.N. (H.M.S. *Resolution*) has been mentioned in dispatches for services in Norway.

The D.S.C. has been awarded to Temporary Surgeon Lieut. (now Temporary Surgeon Lieut.-Commander) William Burnet Douglas Miller, R.N.V.R., for gallantry and devotion to duty in operations in Norway.

CASUALTIES IN THE MEDICAL SERVICES

Royal Navy

Surgeon Lieut. Thomas Ivor David, R.N.V.R., has been reported as "Missing, Presumed Killed," while serving in

H.M.S. *Dundee*. He was educated at St. Thomas's Hospital and took the M.R.C.S., L.R.C.P. in 1937. After qualifying he held the posts of resident surgeon and anaesthetist in the nose, ear, and throat department at St. Thomas's, and of senior house-surgeon, casualty officer, and resident anaesthetist at the Kent and Sussex Hospital, Tunbridge Wells. His home was at Southgate, London.

ROYAL ARMY MEDICAL CORPS

The name of Captain RUPERT WELPLY, R.A.M.C., is included in an Army Council list of casualties, published on October 2, as "Killed." From St. Bartholomew's Hospital he qualified M.R.C.S., L.R.C.P. in 1938. He had been commissioned as lieutenant in the 85th Brigade, R.A., in 1936, and in 1938 transferred to the R.A.M.C., being promoted captain last February.

DEATHS IN THE SERVICES

Surgeon HENRY MALLINS, Bengal Medical Service (ret.), died at Farnham on September 30, aged 89. He was educated at Trinity College, Dublin, where he gained a medical scholarship in 1870, and graduated M.B., M.Ch. in 1872. Entering the I.M.S. as assistant surgeon in the same year he became surgeon in 1873, when the rank of assistant surgeon was abolished, and resigned his commission in 1874. He served at Suppri, India (mentioned in dispatches); with the Khyber column, 1878–80; and was present at the actions of Ali Musjid and Futtehabad (medal and clasp). He was also present at the operations against villages in 1878. For his work he received the thanks of the Government of India. After leaving India he was for many years in practice in England. He was an elder brother of Lieut.-Colonel C. Mallins, Madras Medical Service (ret.).

EPIDEMIOLOGICAL NOTES

Infectious Diseases for the Week

The figures for the principal notifiable diseases in England and Wales for the week under review are higher than they were in the corresponding week last year, when, however, the incidence of infectious diseases was particularly low. Though exact data are not available it is probable that there are at present more children in densely populated areas than at this time last year, and the effect of the herding of non-immunes in both public and private shelters must be considered as likely to lead to a further increase. Nevertheless, despite the appearance of these diseases in epidemic form in reception areas and in rural districts generally, the position remains more favourable than in the year immediately before the outbreak of war—that is, 1938—with the exceptions of cerebrospinal and enteric fevers. The figures for diphtheria, scarlet fever, and pneumonia are lower than the median values for the preceding nine years, but that for enteric fever is slightly more than double the corresponding median value.

In Scotland the increased incidence of infectious diseases this year is relatively greater than in England and Wales, the only exceptions being primary pneumonia, notifications of which are practically the same for both years, and scarlet fever, the incidence of which is lower than in the previous two years. Measles is at present the most prevalent infectious disease in Scotland, and more than one-half the cases were in Glasgow—216 out of 405—during the week. Notifications in Port Glasgow were 35, Kirkcaldy 33, Greenock 31, Paisley 29, Aberdeen 20, Edinburgh 14, and in the only county affected, Lanark, 14. The two deaths recorded were in Glasgow and Edinburgh. Diphtheria was more evenly distributed among counties and burghs, forty-one of the fifty-five being involved, compared with twelve by measles. Areas most heavily attacked were the burghs of Glasgow 136, Dundee 31, Edinburgh 27, Paisley 15, Aberdeen 13, and the county of Lanark 19. Of the 16 deaths 11 were in Glasgow, 2 in Edinburgh, and 1 each in Dundee, Coatbridge, and Hamilton. The cases of typhoid fever were in the counties of Dumbarton 2, Ross and Cromarty 1, and of paratyphoid B fever in the counties of Roxburgh 8, Ayr, Midlothian, and Orkney 1 each, and in the burghs of Ayr 4 and Glasgow 2. Acute poliomyelitis was distributed over the counties of East Lothian 2, Aberdeen, Fife, and Inverness 1 each, and the burghs of Glasgow 2, Greenock 2, and Edinburgh 1.

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INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended September 14, 1940.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1940					1939 (Corresponding Week)				
	(a)	(b)	(c)	(d)	(e)	(a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	122	2	37	2	5	15	2	9	—	—
Deaths		5	6				—	2		
Diphtheria	1,027	28	348	31	30	823	36	179	32	11
Deaths	41	1	16	1	2	28	1	2	1	—
Dysentery	33	5	63		—	34	2	20		—
Deaths			—	—	—			—	—	—
Encephalitis lethargica, acute	4	—	—		—	3	—	—		—
Deaths		—	1				—	1		
Enteric (typhoid and paratyphoid) fever	93	1	20	12	1	77	2	7	3	7
Deaths	—	—	—	—	—	3	—	—	—	—
Erysipelas		7	58	3	7			59	2	3
Deaths		—	—				—	—		
Infective enteritis or diarrhoea under 2 years	62	3	13	17	11	48	4	19	11	13
Deaths										
Measles*	6,179	78	405		19			7		4
Deaths	14	—	2	1	—	2	—	—	—	—
Ophthalmia neonatorum	91	1	19		—	64	3	22		1
Deaths										
Pneumonia, influenzal†	440	13	2		4	266	14	4		2
Deaths (from influenza)	9	—	—	—	—	10	—	3	—	—
Pneumonia, primary			105	9				103	5	
Deaths‡				1	5		—		7	2
Polio-encephalitis, acute	6	—				2	—			
Deaths							—			
Poliomyelitis, acute	47	—	10	—	—	29	8	1	1	1
Deaths			—				1	—		
Puerperal fever	3	3	13	1	—	3	3	15	3	1
Deaths		—					—			
Puerperal pyrexia	113	3	17		2	150	9	16		1
Deaths										
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	1,384	47	157	31	27	1,139	32	191	45	58
Deaths	2	—	—	—	1	3	—	—	—	—
Small-pox	—	—	—		—	—	—	—		—
Deaths	—	—	—	—	—	—	—	—	—	—
Typhus fever	—	—	—	—	—	—	—	—	—	—
Deaths			—	—	—			—	—	—
Whooping-cough*	1,106	8	111		13			13		5
Deaths	7	1	1	2	1	6	2	1	1	—
Deaths (0-1 year)	328	50	53	25	24	251	26	67	39	16
Infant mortality rate (per 1,000 live births)										
Deaths (excluding still-births)	5,228	1,450	544	154	120	4,017	607	562	153	123
Annual death rate (per 1,000 persons living)			11.0	10.3	10.5			11.4	10.3	10.8
Live births	5,438	665	878	327	219	6,015	845	829	324	216
Annual rate per 1,000 persons living			17.8	21.8	19.2			16.8	21.8	19.0
Stillbirths	207	20	45			233	22	35		
Rate per 1,000 total births (including stillborn)			49					41		

* Made notifiable generally on November 1, 1939.

† Includes primary form in figures for England and Wales, London (administrative county), and Northern Ireland.

‡ Since January 1, 1940, figures for London (b) have been for deaths from all forms of pneumonia; the corresponding figures for 1939 relate to deaths from lobar pneumonia only.

Medical News

The thirty-second annual meeting of the Medical Benevolent Society for the East and North Ridings of Yorkshire (including the City of York) was held in the York Medical Society's rooms, Stonegate, York, on September 25. New members were elected and an application for help considered and granted. The hon. treasurer's report showed a most satisfactory financial position. Grants had been made as before; and in one case the widow of one member who had paid five guineas in subscriptions had received over a period of years help amounting to £457 10s. It was stressed that as some of the members were on active service the possibility of help being needed is much greater than in peacetime. The officers for the ensuing year were elected—Drs. W. W. A. Kelly and J. D. Burrows of 92, Micklegate, York, being the secretaries.

A short intensive course in industrial medicine and in industrial hygiene will be given at the London School of Hygiene and Tropical Medicine, beginning on Monday, November 11, and lasting two weeks. It is intended especially for works medical officers. The lectures will be delivered by recognized experts, and visits to factories are being arranged. Further particulars will be found in our advertisement columns.

Miss Muriel E. Landau, F.R.C.S., will deliver her presidential address before the London Jewish Hospital Medical Society at 37, Mapesbury Road, N.W., on Sunday, October 20, at 3.30 p.m. Members who wish to be present must signify their intention to the lay secretary at the London Jewish Hospital by October 14.

Owing to existing conditions the Zoological Society of London has decided to cancel its scientific meetings until further notice.

The September issue of the *Glasgow Medical Journal* contains an educational supplement.

The issue of the *Archives of Surgery* for August is dedicated to Dr. Dean Lewis, emeritus editor of the journal, and professor of surgery at Johns Hopkins University in succession to Dr. William S. Halstead.

Dr. Archibald Malloch, the librarian, has arranged an exhibit of books on the historical aspects of military medicine at the New York Academy of Medicine. The display begins with one of the earliest records of the treatment of gunshot wounds, and continues chronologically up to an account of gas warfare published in 1940.

Medical men from Witwatersrand University have combined to organize a complete ambulance unit of their own capable of doing plastic and other facial operations in the field apart from other medical treatment. The ambulance will also have its own operating theatre and equipment.

To offset the scarcity of men doctors for the Forces enlisting in Australia, the Minister for the Army has given his approval to the appointment of women doctors for service both at home and over-seas.

Dr. Katherine McNeill, who is in charge of the Durban Child Health Department, is the first woman medical officer of health to be appointed to the Union of South Africa for the duration of the war.

The governors of the Yorkshire Children's Orthopaedic Hospital, Kirbymoorside, have unanimously decided to rename the institution the Adela Shaw Orthopaedic Hospital. This pays tribute to the close association of the chairman of the board, Mrs. Edward Shaw, C.B.E., J.P., with the hospital since its inception in 1925, when she assigned the land and buildings of the former Red Cross Hospital to the trustees. From the time of its foundation fifteen years ago, when it was the only children's orthopaedic hospital in Yorkshire, the hospital has received and treated a large number of crippled children from all parts of the country. The change of name also foreshadows the admission of adult patients after the war.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, W.C.1.
Authors desiring REPRINTS of their articles must communicate with the Secretary, B.M.A. House, Tavistock Square, W.C.1, on receipt of proofs. Authors over-seas should indicate on MSS. if reprints are required, as proofs are not sent abroad.
ADVERTISEMENTS should be addressed to the Advertisement Manager (hours, 9 a.m. to 5 p.m.). Orders for copies of the *Journal* and subscriptions should be addressed to the Secretary.
TELEPHONE NO.—B.M.A. and *B.M.J.*: EUSTON 2111.

QUERIES AND ANSWERS

Morphine Tolerance

"P. H. S." writes: Recently I have had an instance where more morphine was given than in Dr. Robert D. Campbell's case (October 5, p. 478). The patient—my mother-in-law—had bony metastases in the spine, clavicle, and femur twenty-three years after removal of a breast, which resulted in a fracture of the femur. For convenience she lived in my home, and during the period she took such large doses of morphine she insisted on getting up and coming downstairs on a specially constructed chair! Her pain was mostly in the fractured limb and over the fifth lumbar vertebra, where one of the metastases was situated. For many weeks she took either four or five 15-grain morphine cachets daily along with a 10-grain morphine suppository at night (the latter for treatment of haemorrhoids—so the patient thought). That amount of morphine eased most of the pain, and she could eat, sleep, and talk in a normal way. Later hyoscine was added to the cachets, and nembutal was also given at night-time. This allowed reducing the morphine to 7-grain cachets, with a 1/50-grain hyoscine hydrobromide suppository and a 7-grain morphine cachet, and a 1/50-grain hyoscine suppository and two nembutal capsules at night. On more than one occasion the patient woke up in the morning with no pain and went the whole day without any morphine at all! On these days she would sleep all day, not even waking for food. The following day she would have 85 grains and yet not sleep until night.

LETTERS, NOTES, ETC.

Ear Plugs

Dr. J. EWING KENNEDY writes: Correspondents have asked for particulars concerning my letter (September 28, p. 436). Glitter wax is made by the Cosmic Crayon Co., Ltd., and is obtainable at Boots Chemists and other stores. This plastic need not be pushed into the inner meatus. It is obtainable in various colours, including white.

Sanitation and Evacuation

"J. C. M." writes: Your various correspondents' remarks on health and soil appear to me of purely academic interest at the moment. Such facts as that 12,000 people were evacuated or evacuated themselves into this district within one week, without the provision of a single extra W.C., are surely more important. Housing committees seem to act on floor space; what they should consider are toilets, bathrooms, and cooking stoves. Patriotic women overcrowd their houses to the attics. I recollect articles in this *Journal* long ago pointing out the undesirable effects in slumland of the W.C. queues; for that is what it amounts to. So far the only action our profession has taken is to inoculate themselves and families with T.A.B., by all appearances. If people can send their children over-seas I do not see why more use is not made of comparatively vacant spaces in Scotland.

Relief for Volunteer A.R.P. Personnel

Dr. E. M. HERBERT (London, W.1) writes: Patients who are working all day at their usual work and are volunteer A.R.P. and A.F.S. workers at night are causing a great deal of anxiety to their doctors, as the constant strain is undoubtedly telling on their health. It should be possible to arrange a rest period at the end of, say, two weeks—that is, two weeks on and two weeks off duty. At present there are many young men awaiting their calling-up papers; could it not be arranged that they should be trained to take over some of this work, which is of as much importance to the country as the military? If this is not possible, the military could perhaps arrange for some troops to be released and trained in this vital work. If something is not done in the near future we shall have serious loss of efficiency and damage to health amongst the personnel of these important services.